SPACE STANDARDS IN LOW-COST HOUSING WITH SPECIFIC REFERENCE TO URBAN AREAS OF CENTRAL SUDAN

VOLUME II:

A PRACTICAL APPROACH TO THE FORMULATION OF SPACE STANDARDS IN URBAN AREAS OF CENTRAL SUDAN

PART ONE: USER REQUIREMENTS: A CASE STUDY

PART TWO: SPACE STANDARDS FOR LOW-COST HOUSING OF CENTRAL SUDAN

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INTRODUCTION TO VOLUME II

Some of the theories and methods which underlie the provision of space in mass housing have been discussed in Volume I of this study. The uses, concepts, forms, units and statutory significance of space standards have been reviewed and a general theoretical and methodological background has been established with close reference to mass housing of central Sudan.

The present volume attempts to apply these theories and methods to arrive at certain recommendations on space standards for low-cost housing of Central Sudan. It aims first, to provide some relevant factual information about the social and economic characteristics of the users of low-cost housing; second, to provide some insight into their ways of living, attitudes, opinions and general housing requirements; and third, to suggest, on these bases, standards for space provision and to discuss related aspects of design and layout. The study does not deal with all aspects of low-cost housing, but only with those which are related in one way or another to the provision and use of space in the home.

The material provided in this volume is mainly based on the results of a number of interviews and field observations I have undertaken in various housing projects in urban areas of central Sudan. Although only one of these projects (Khartoum North) is taken for case study, and is described in some detail in this volume, I have discussed, where relevant, the findings from the surveys of the other projects.

This volume is divided into two parts.

The first part gives a detailed account of the results of the interviews and observations: Chapter 1 describes the survey method and the background conditions in Khartoum North, the project chosen for case study; Chapters 2 and 3 describe the social and economic characteristics of the households; Chapter 4 examines the tenants' adaptations and satisfactions with their homes and Chapter 5 describes the uses that are being made by the tenants of the spaces in and around their homes. A statistical summary of the results obtained from Khartoum North Study is also given in Appendix (5).

The second part of this volume discusses the findings of these interviews, and observations in relation to other aspects of the problem[1] and puts forward some recommendations on space standards for low-cost housing of central Sudan: Chapter 6 attempts to redefine the functions performed in the Sudanese low-income family home and to assess their space and general design requirements; Chapter 7 distinguishes between the requirements of different types of families; and finally, Chapter 8 gives a brief summary of the findings and recommendations of the study.

In addition to the material obtained from the field surveys, I have made use of available statistical data on population and housing in towns of central Sudan and have

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1. Such as design solutions, financial policies, and house building costs.

received oral evidence from various housing authorities. I have also had the chance to discuss some of the findings of the studies with the concerned housing authorities. The responsibility for these findings and recommendations however, remains to be totally mine.

PART ONE:

USER REQUIREMENTS: A CASE STUDY

CHAPTER 1: THE STUDY BACKGROUND

1.1 INTRODUCTION

The present situation in the Sudan points to a considerable lack of information about the users of mass housing. This lack of information is due in part to the very recent involvement in the field of mass housing, dating back only to the early 1950's, and in part, to the lack of experts in the field of user studies. For the designer or the research workers there are, therefore, only two possibilities; either to go to the field himself and dig out the necessary information about the users, or else to rely upon subjective experience and assumptions of user needs which have not been tested. The first alternative is usually limited by time, money, etc., and the second by the likelihood of repeating previous errors and misconceptions.

So far, mass housing in the Sudan has developed to meet the urgent need to accommodate growing numbers of urban dwellers, most of whom have limited or no personal savings. Under these circumstances, the main concern has been on the number of houses produced, their cost and speed of erection. Housing standards have been arbitrarily accepted according to family income with little or no regard to the size of family and variations between different families in needs, patterns of living and aspirations.[1]

The standards themselves seem to be high in relation

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1. See A.A. EL AGIB, "The Housing Problems of Major Towns in the Sudan: Dimensions and Solutions". A paper (in Arabic) delivered at the Round-Table Conference, Khartoum, March, 1967.

to the family income. There is evidence that some of the families allocated plots of land in the new extensions to towns have sold them because they were unable to build to the standards prescribed.[1] Some of those allocated houses have completely or partly sublet them. This discrepancy between income levels and standards of housing has meant, in some cases, that housing schemes originally intended for low income groups were made use of by other groups with relatively higher incomes.[2]

This situation is likely to persist unless there is conscious direction first, to define in social and economic terms the type of user for whom mass housing should cater; second, to initiate a programme of functional and social research directed towards understanding his needs;[3] and third, to experiment on the type of housing most suited to these needs and to national, technical, financial and economic possibilities.[4]

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1. See A.J.V. ARTHUR, "Slum Clearance in Khartoum." Article in The Journal of African Administration, April 1954, Vol. VI, No.2 pp. 73 - 80. A.A. EL AGIB, ibid., p. 13.
2. See Volume I; CHAPTER 1.
3. In the field of functional and social research, reference must be made to the outstanding work by S. FAWZI on "Social Aspects of Low-Cost Housing in Northern Sudan", Khartoum, 1954. It should be noted, however, that since the time of this study, the housing situation has changed a great deal.
4. Housing authorities in the Sudan are in fact becoming aware of most of the discrepancies outlined above and efforts are being directed at rectifying and improving the situation. Within the next three years the activities of the National Housing Authority will be mainly concerned with a programme of research for which financial provisions have been made.

1.2 AIMS OF THE STUDY

This case-study aimed to provide some factual bases for the formulation of space standards for low-cost hosuing in urban areas of central Sudan.[1] Towards this end, an attempt was made, first, to collect relevant background information about the users of mass housing (e.g. income levels, sizes and types of households), and second, to analyze their patterns of living, adaptations and satisfactions with the form of housing provided by the government. A number of design, planning and management problems were discussed, but emphasis was particularly placed on aspects of user requirements which are related to the provision and use of space in the home.

1.3 METHOD OF THE STUDY

(i) GENERAL

A recently completed government housing project in the town of Khartoum North was chosen for detailed appraisal.[2] Khartoum North Project was operated by the National Housing Authority, NHA, (Ministry of Local Government) as part of its policy "to build low-cost houses and distribute them to low-wage earners on hire-purchase basis throughout the Sudan".[3] The project, comprising 1,000 houses, is so far

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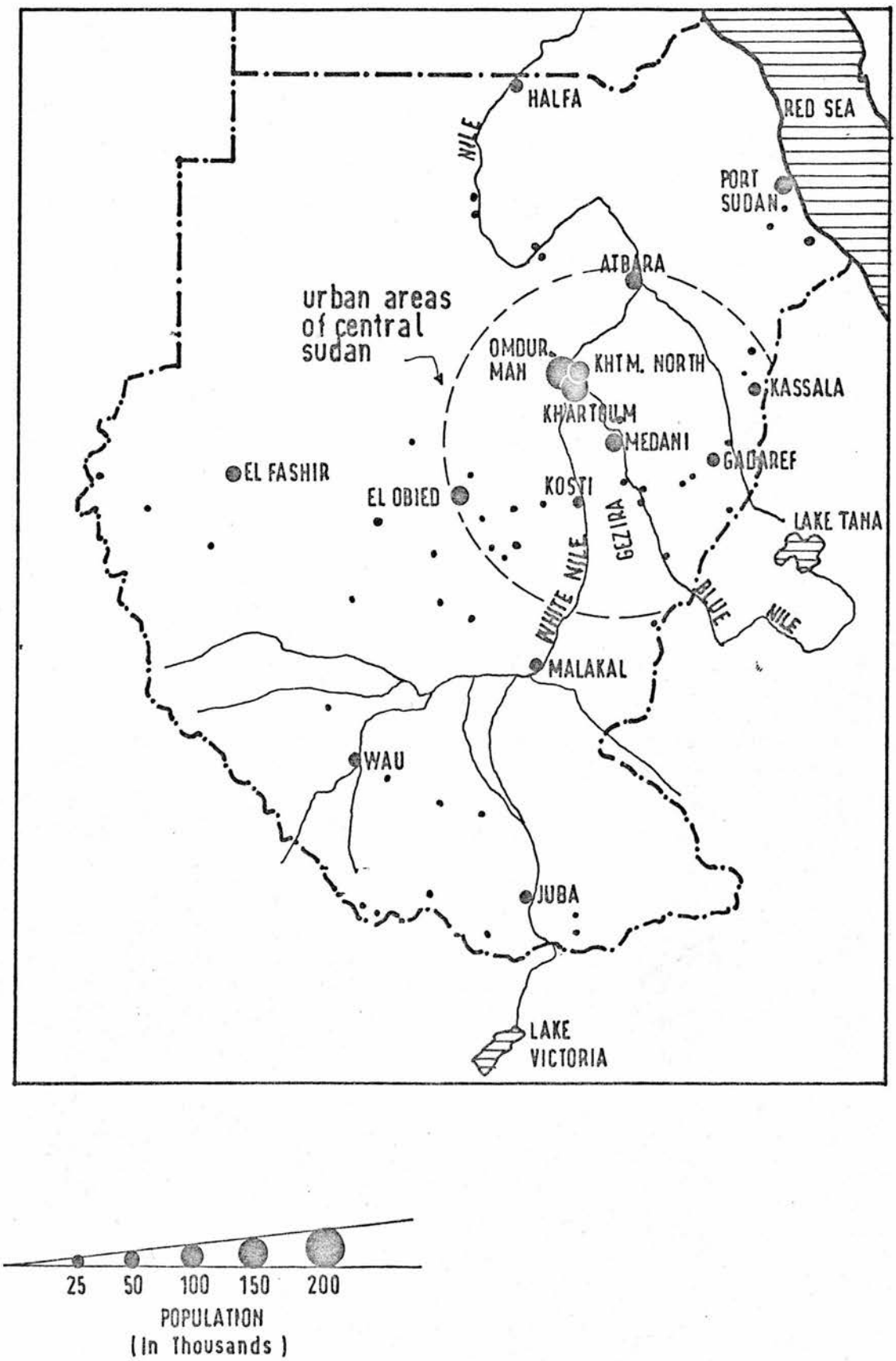
1. Urban areas of central Sudan are defined here as those within a circle, having Wad Medani as its centre and limited on the north by Atbara, south by Kosti, east by Gadaref and west by El Obeid; (figure 1).
2. Khartoum North housing project was started in 1961 and completed in 1967; see later.
3. A. HAMID, (Director of NHA) "A Case Study on Khartoum North Low-Cost Housing". A note prepared for the United Nations Centre for Housing, Building and Planning, Khartoum. July, 1967.

figure 1:

URBAN AREAS OF CENTRAL SUDAN



the largest experiment carried out on such policy lines in central Sudan.

The houses in the project were built to standard plan types in standard plots: for purposes of the present study this was a considerable advantage as it limited the number of design variables. The project, in addition, incorporates some planning features and policy lines of particular interest to a study connected with the provision and use of space in mass housing.[1]

The study was largely based on the results of interviews and field observations undertaken by the author (with the help of students from Khartoum University) in the summer of 1967. The interviews were based on a 50% sample of houses (i.e. 500 houses)[2] selected at random from the lists available with the National Housing Authority. Altogether, 444 houses were successfully visited with all survey forms completed.

(ii) THE SURVEY FORMS[3]

Three forms were filled in for each house in the sample,

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1. The layout, for example, was considered "wasteful of land and uninteresting"; the open spaces associated with the groups of dwellings "too big to be in keeping with the scale of the surrounding houses"; and the policy lines adopted in the project "of allocating the three-roomed house in accordance with the applicant's income, without regard to family size", was found to be needing reconsideration. see, A. HAMID, ibid., p. 16.
2. It was difficult to know the total number of households beforehand as some houses were occupied by more than one household (see later). The sample was, therefore, based on houses rather than households.
3. All survey forms were translated into Arabic.

as follows:

(1) Male Householder Interviewing Form: (Appendix 2): This form contained all questions relating to family background (e.g. number of children, place and date of migration, occupation, possessions and income levels), plus questions relating to attitudes and opinions about the house. It was thought logical to include all such questions in this schedule because of the leading position that male heads of households have in all matters relating to family and house.

(2) Housewives Interviewing Schedule: (Appendix 3): This form contained questions related in most cases to the way housewives carried out their domestic functions. A few questions were also included on housewives' views about the house and the privacy it affords from male visitors and passers-by.

(3) Observations Schedule: (Appendix 4): The observations schedule was designed in the form of a check-list and filled in by observers without any help from the occupants. To each observations schedule was attached a plan of the house; the observer was instructed to record alterations and additions made to the plan, the layout of main items of furniture and equipment, positions of trees and gardens, etc.

(iii) OTHER SOURCES OF INFORMATION

In addition to the material contained in the survey forms further studies were organised on such topics as, types and sizes of furniture, standards of housekeeping, distribution of householders' time in the house and the public health aspects of the project. Other background information about the project and the tenants was obtained from the National Housing Authority.[1]

For purposes of comparison, two other housing projects were visited and short interviews were held with their occupants.[2] In one of the projects (the New Deims) a study was, for example, undertaken on the use made of the open space around the houses; the findings are discussed and compared with those arising from Khartoum North Project; see later.

(iv) ORGANISATION OF THE SURVEY

Before fieldwork began, all survey forms were discussed with some interested parties.[3] Some valuable criticisms were made and as a result the forms were revised in both form

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1. By courtesy of the director.
2. The two projects were:
   (1) The New Deims Project: built in 1953 on policy lines similar to those adopted in the Khartoum North Project. The project comprises 232 houses of which 74 houses have been visited.
   (2) Khartoum Third-Class Extensions: In 1962, over 2,000 plots of land were distributed among low-income families in Khartoum. Other than specifying minimum regulations and standards of construction, the tenants were given complete freedom to build for themselves inside these plots of land. In Khartoum Extensions 368 houses have been visited.
3. These included:
   The director of the National Building Research Station, Khartoum;
   The director of the Department of Statistics, Khartoum; and the director of the National Housing Authority, Khartoum.

and content. One point which emerged was the need to translate all forms into Arabic to ease communication between the interviewer and the informant and to ensure that the right questions were asked. It was also felt essential to leave some of the questions 'open-ended' and to ask interviewers to record all comments made by the informants in the Pilot Survey.

A team of sixteen students of architecture, social sciences and medicine took part in the survey. After explaining its purpose and method, the first step was to agree on a common language for recording comments and observations. This was first explained verbally and later demonstration interviews were carried out by the author with some co-operating families in the presence of all team members.

A pilot survey was undertaken in order to examine the sequence and contents of questions, the method of survey and the time consumed. It was found during the pilot study that questions relating to family income, number of families in the house and number of children were not regarded by informants with much enthusiasm.[1] Otherwise everything else worked satisfactorily. The length of interview varied between 45 and 60 minutes.

Fieldwork for the main part of the study lasted for eight weeks during which time 444 houses were successfully

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1. In the final survey, interviewers were instructed to ask these questions just before the end of the interview.

visited.[1] The analysis in the next chapters is mainly based on this sample. A statistical summary of the results is given in Appendix 5.

1.4 DESCRIPTION OF THE PROJECT

(i) GENERAL

Khartoum North was chosen for the project because of its high concentration of industry and its relatively high concentration of working-class families with low incomes. The population of the town has more than doubled in the nine-year period between 1955 and 1964.[2] In addition, there had been an increase in the number of people who work in the town but have found residence in other nearby towns, such as Khartoum and Omdurman. Every morning thousands of cars cross over the bridges from either side, bringing in labourers and causing heavy loads of traffic (Figure 2).

The project, as already mentioned, was intended to assist those families with limited incomes[3] to buy their own houses according to easy terms of repayment and thereby escape the unduly high rents of houses. Also, as houses could be found close to places of employment, it was felt

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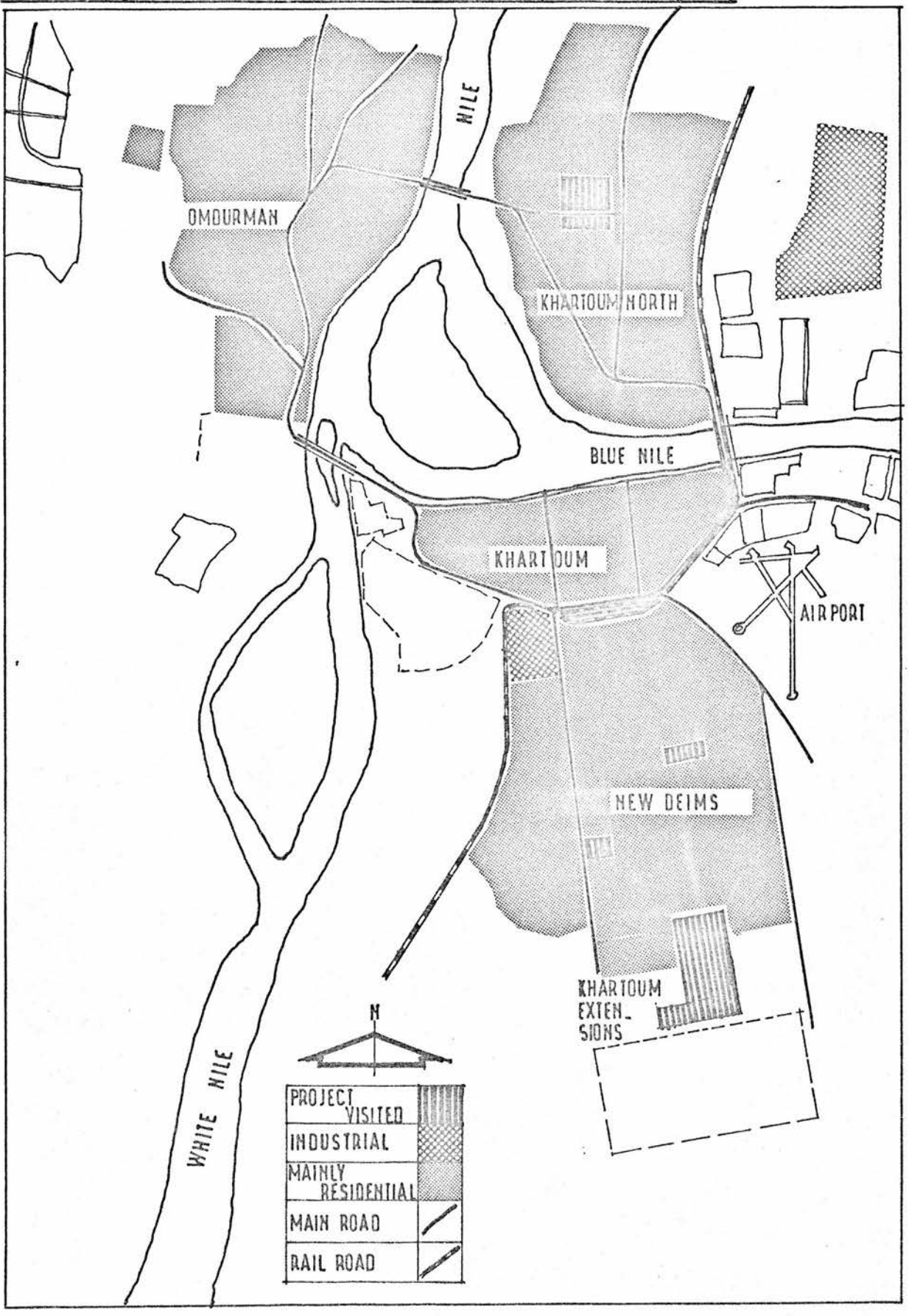
1. Over 450 houses were actually visited, but the information in some of the forms was found to be incomplete. Such forms were, therefore, not included in the final analysis.
2. THE DEPARTMENT OF STATISTICS 1955/56 Census gave the total population of Khartoum North as 39,082. The "Population and Housing Surveys" of 1964/65 gave the figure of 80,010 people (i.e. over 100% increase of population in this nine-year period).
3. The limited income earner was defined, for the purposes of the project, as someone with a monthly salary plus cost of living allowance in the range £S12 - 25; see Qualifying Criteria, Appendix 1.

figure 2:

THE THREE TOWNS:

KHARTOUM, OMDURMAN & KHARTOUM NORTH (scale 1: 75,000)



that this would reduce the high expenditure in time and money and the heavy load of traffic across the Nile.

(ii) FINANCIAL AND ADMINISTRATIVE ASPECTS

Houses in the project were sold to the qualified tenants according to hire-purchase terms. Government interest was fixed at a compound rate of 3%, and land was provided on leasehold (renewable over a period of 40 years) at a nominal price of approximately one shilling per square metre. The qualified tenant was required to pay in advance 10% of the total cost of the house he was allocated, the rest to be paid in monthly instalments not exceeding a quarter of his salary at the time of application. During the amortisation period (between 12 and 20 years), maintenance is the responsibility of tenants but the National Housing Authority gives advice and makes supervision.

Two house types were built: a two-roomed house for those with incomes £S12 - 18 per month (figure 5), and a three-roomed type for those with incomes £S19 - 25 per month (figure 6). The project comprises 700 of the two-roomed houses and 300 of the three-roomed houses.[1]

Tenants were selected according to a system of points[2] and the houses were provided for them in the form of complete units ready for occupation after the installation of electricity and water supply.

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1. These were built in two phases: the first phase of 500 houses (350 of the two-roomed and 150 of the three-roomed) was started in 1961 and completed in 1962 (14 months later). The second phase, for various reasons, was completed in six unequal parts over a period of four years, ending in May, 1967.
2. Based on the "Qualifying Criteria" shown in Appendix 1.

(iii) THE SITE

The site occupies part of the flat plain north of the old town of Khartoum North, with the new Shambat Bridge linking Khartoum North with Omdurman only a short distance to the west. The main Dawahi road, linking the site with the town centre, is only a few metres to the east. Beyond this road is the native area of Danagla. The latter separates the site from Khartoum North Industrial area. From all other sides, the site is bounded by privately built houses of first and second class category,[1] which have been constructed in recent years, particularly after the completion of the bridge (figure 3).

(iv) THE LAYOUT

The site occupies 130 acres; houses are laid according to a grid-iron plan with major and minor roads parallel to each other or crossing each other at right-angles. Roads vary in width from 10 metres for a minor road providing access to the individual house to 20 or 25 metres for major roads providing access to the centre of the neighbourhood[2] (figure 4).

The project comprises two main residential communities, a short distance from each other and separated by a row of privately built houses and by the main road running towards

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1. Houses in urban areas are classified as first, second or third class according to standards of construction, material, and space. First class houses have higher standards than second class houses and so on. Houses in the sample are classified as 'third class'.

2. All minor roads were left unpaved, but due to their width (10 metres) they encourage both pedestrian and vehicular circulation. This point is further discussed in Chapter 5 "USE OF SPACE..."

figure 3:

THE SITE (scale 1:50,000)

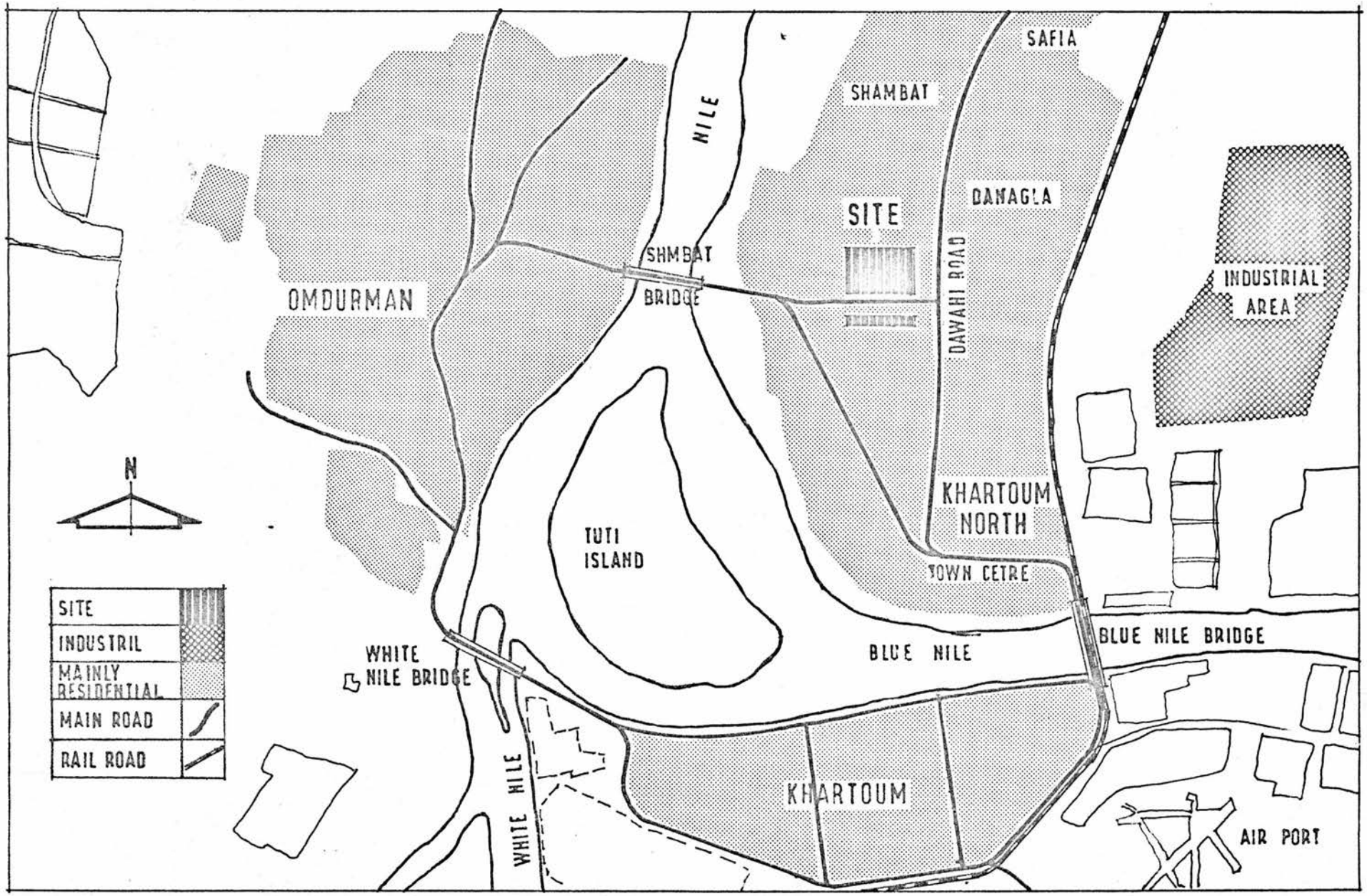
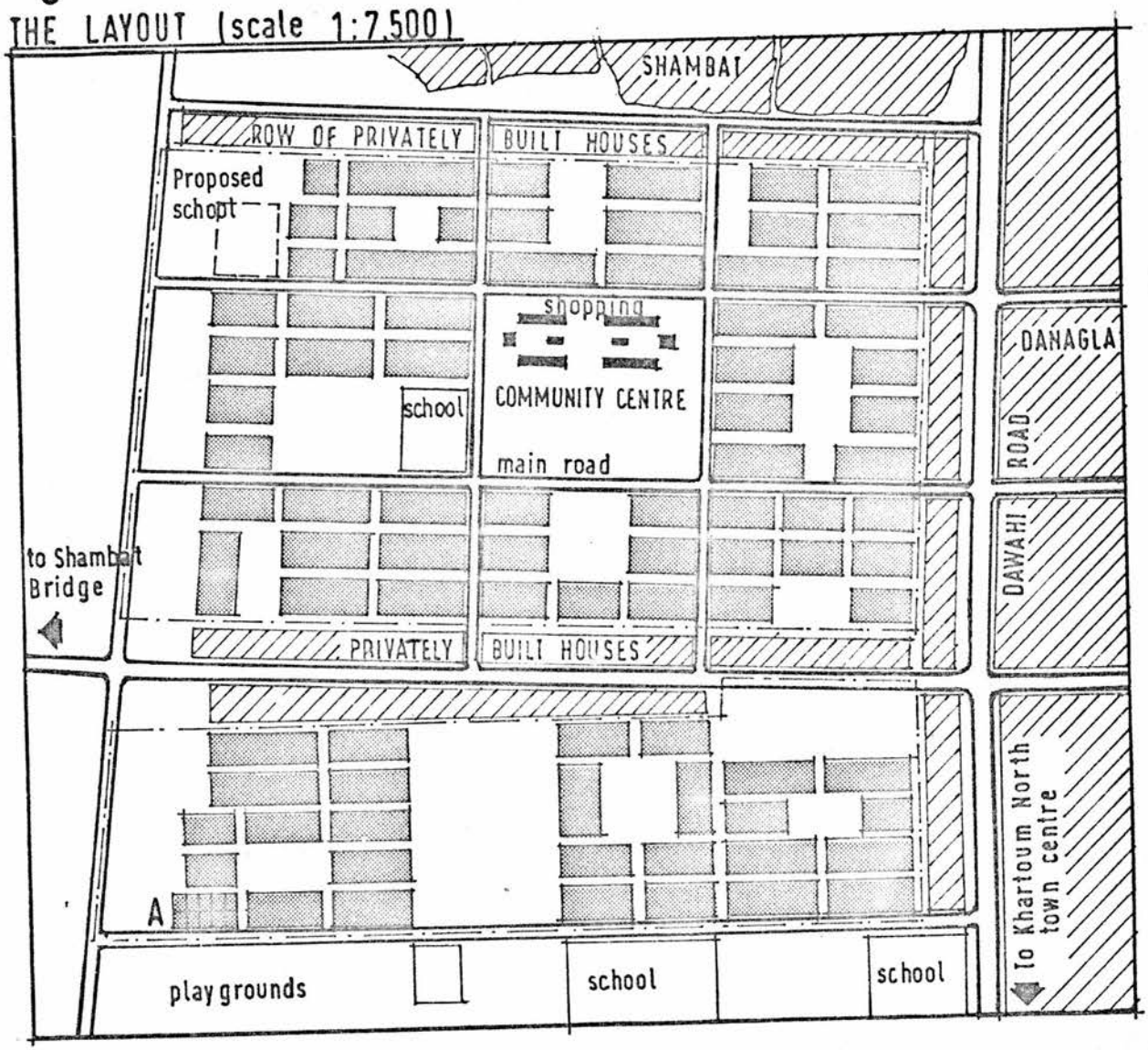
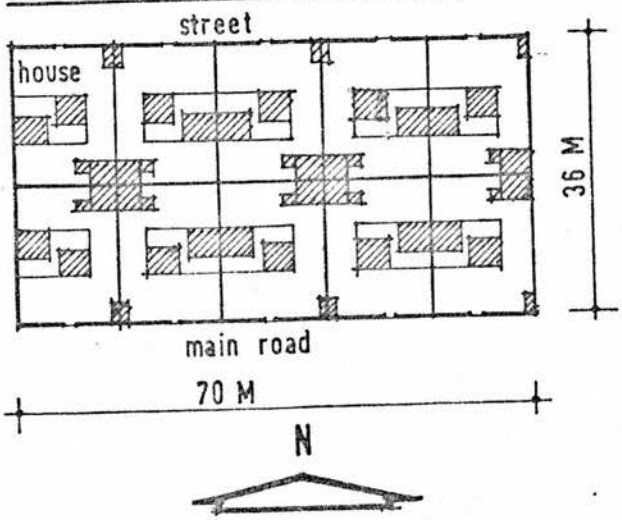


figure 4:

THE LAYOUT (scale 1:7,500)



DETAIL OF STREET BLOCK (A)



BASES FOR CALCULATION OF DENSITY

1. Net Residential Density = $\frac{\text{Total No. of people}}{\text{Area covered by plots + semi-private open spaces}}$

2. Gross Residential Density = $\frac{\text{Total no. of people}}{\text{Gross site area (shown dotted)}}$

DENSITY

GROSS ACCOMMODATION DENSITY = 7 HOUSES/ACRE

GROSS RESIDENTIAL DENSITY = 64 PERSONS/ACRE

NET RESIDENTIAL DENSITY = 124 PERSONS/ACRE

PLATE 1.
The shopping centre.

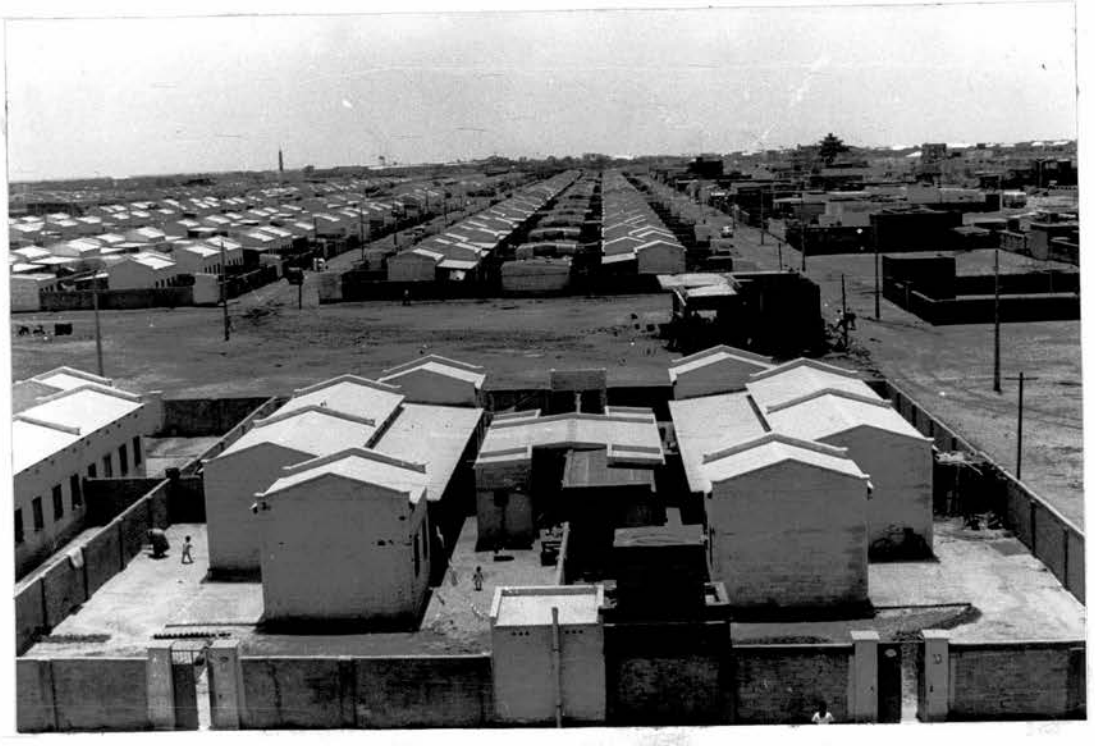


PLATE 2.
Bird's view of house type (1).

the bridge. Each of these communities is further subdivided into small residential groups (of the order 60 to 70 houses) served by an open space. The individual group consists of a number of street blocks, two plots in depth, such that each plot opens into the road at one side (figure 4).

Communal shopping and recreational facilities are grouped together and provided for in the centre; plate 1.[1] In addition, there are more facilities outside the boundaries of the scheme. Schools for boys and girls, for example, are found only within a short walking distance from the southern boundaries of the scheme.

The density is just over seven houses to the acre; about one half of the site (51%) is built-up (i.e. lies within the boundary walls of the plots) and the rest is occupied mostly by roads and public open spaces, (Table 1).

TABLE 1

LAND USE

Land use	Area (in acres)	% of site area	Area/person (in sq.m.)
Total site area	130	100%	63
Built-up area*	67	51%	32
Area for community services	14	11%	7
Public open spaces	13	10%	6
Roads	36	28%	17

*Includes all area within the boundary walls of the plots.

1. At the time of the survey only the market area, school and club were built, but proposals include various other facilities, such as mosque, cinema, health centre and fire stations.

PLATE 3.
Another view of house type (1).

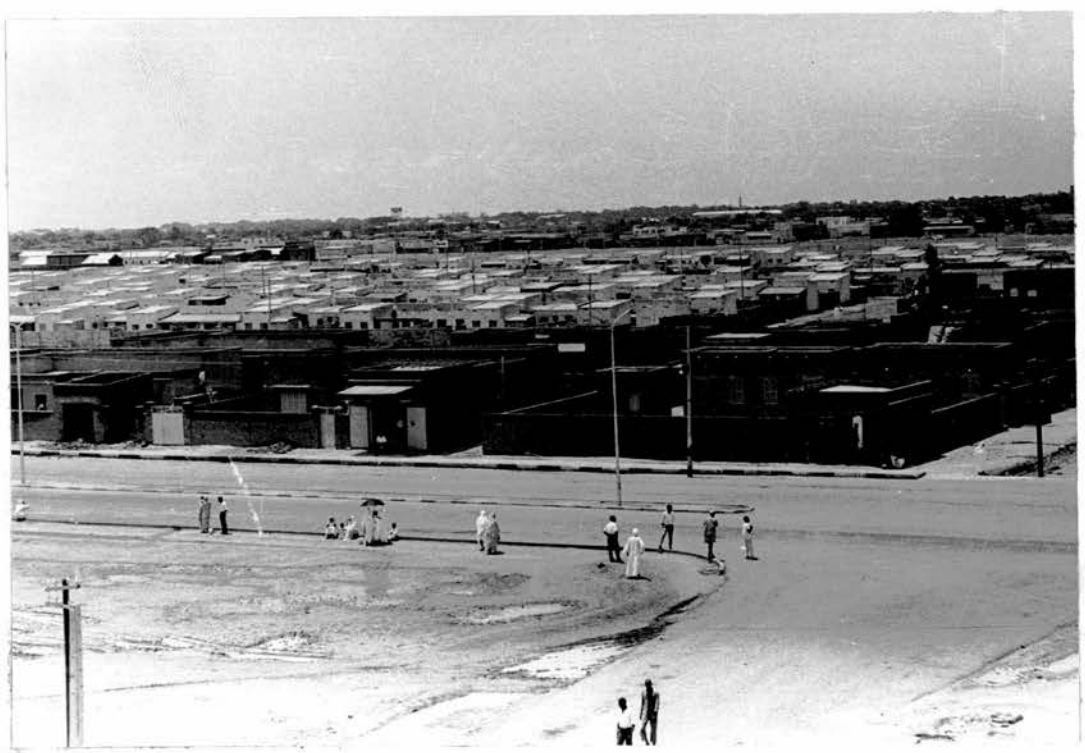


PLATE 4.
House type (2).

Gross Residential Density 64 Persons/acre[1]

Net Residential Density 124 Persons/acre

Gross Accommodation Density 7 Houses/acre

(v) THE HOUSES

The houses were built to two model plan types:

House type (1): with three main rooms, verandah, kitchen, bathroom and acqua-privy[2] built on an average plot area equal to 320 square metres; figure 5. See also plates 2 and 3.

House type (2): differs from house type (1) in that it has only two main rooms and no verandah. The house is built on an average plot size equal to 250 square metres; figure 6. See also plate 4.

Rooms in both house types are grouped inside the plot to create separate courtyards; the 'family rooms', kitchen and bathroom open into an inner compound while the 'guest room' opens into an outer compound. The houses are built in the form of single-storey, semi-detached units. The height of the rooms vary from 3·50 metres (in the living-rooms) and 2·50 metres (in the bathroom and acqua-privy). The external walls of the compounds are 1·80 metres high.

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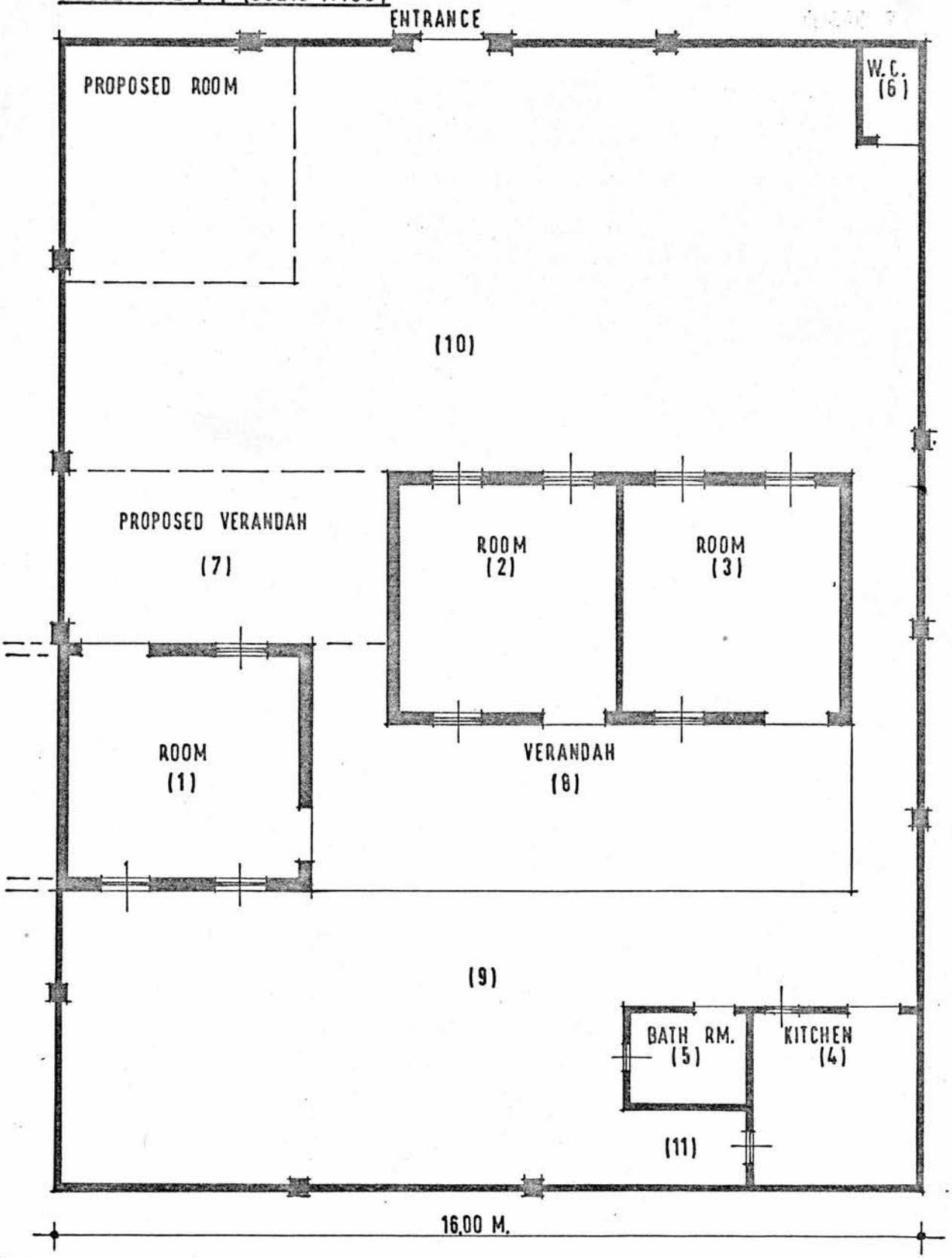
1. Calculated on bases of observed occupancy rates (see later).
2. In the earlier phases of the project houses were provided with bucket latrines; but those built in the final phases have acqua-privies. The latter are types of water-sealed latrines manufactured on site.

figure 5:

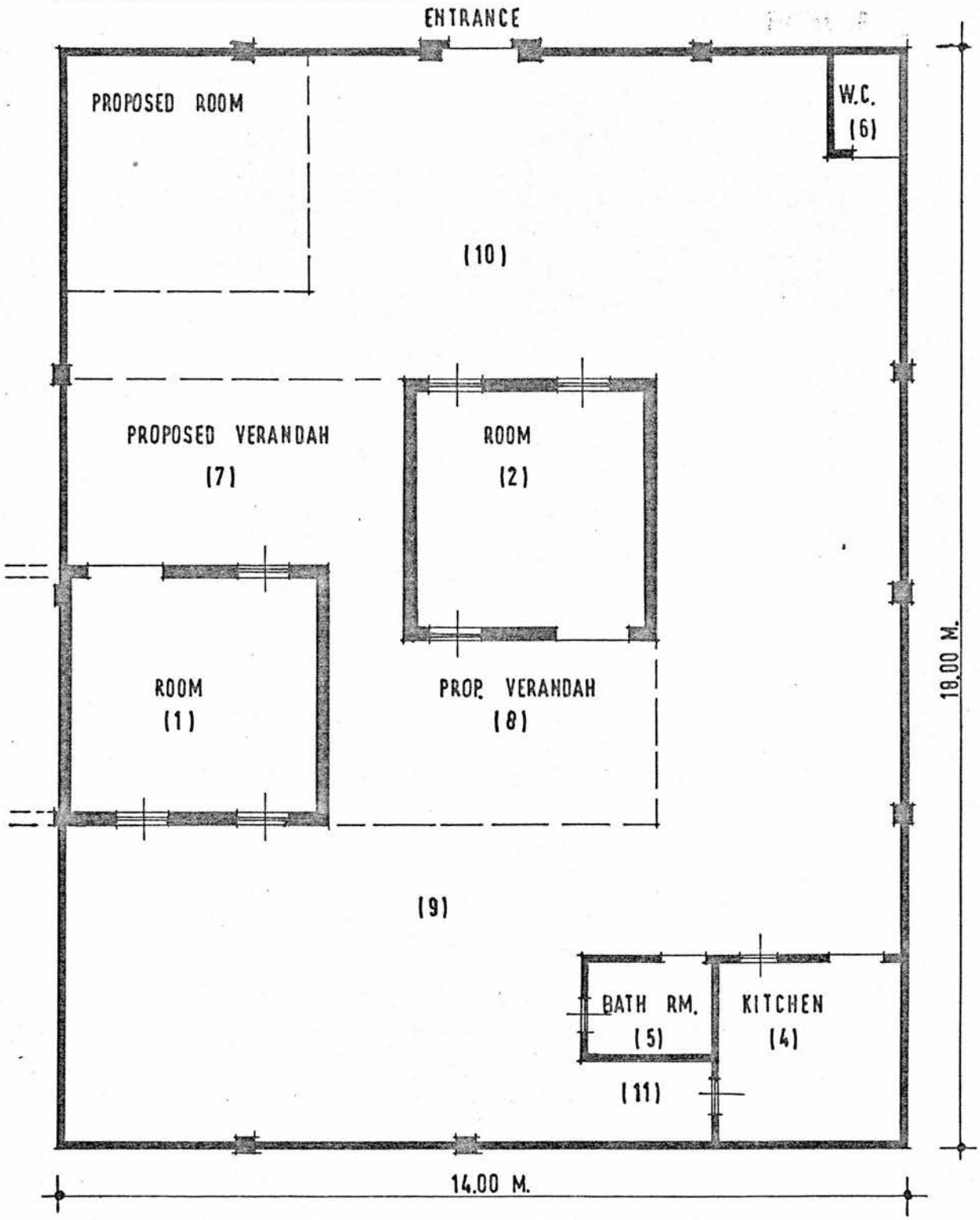
HOUSE TYPE (1) (scale 1:100)



PLOT AREA	320	SQ. M.
COVERED AREA	85	
COVERAGE	27 %	

figure 6:

HOUSE TYPE (2) (scae 1:100)



PLOT AREA	250	SQ M
COVERED AREA	43	
COVERAGE	17 %	

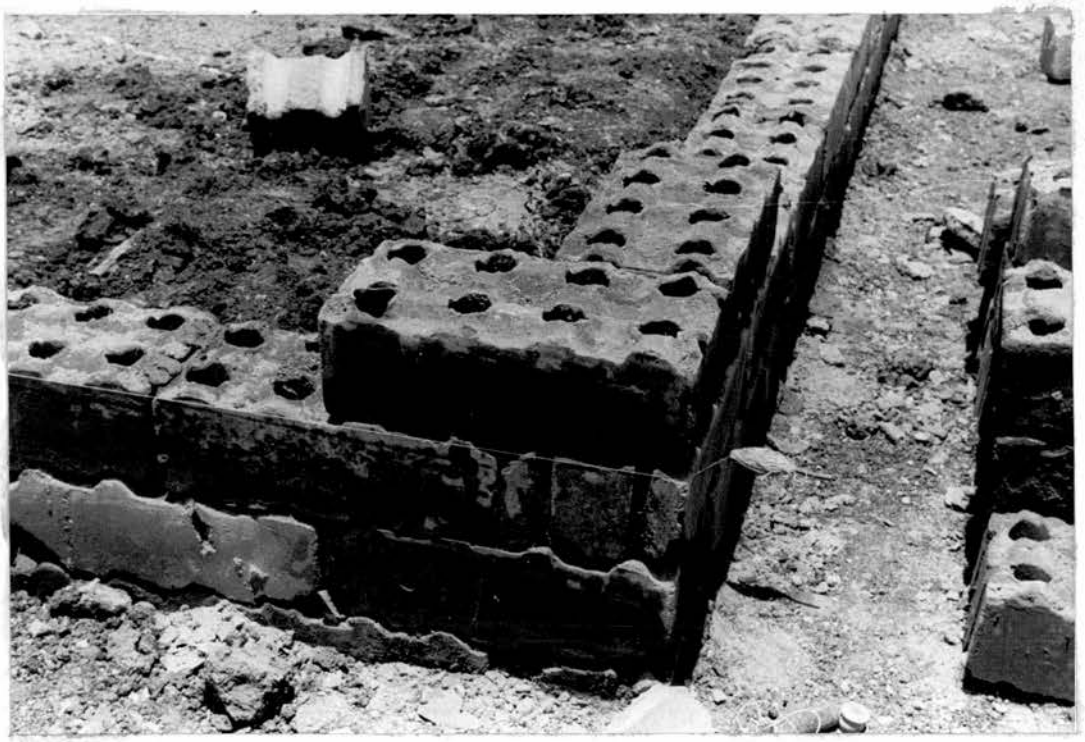


PLATE 5.
Detail of hollow blocks.

PLATE 6.
Wall construction.

An interesting feature of the project is the use of self-aligning sand and cement perforated blocks in the wall construction. Two sizes of blocks were used throughout: the first, measuring 18" x 9" x 6", was used in the construction of main rooms and the second, measuring 18" x 6" x 6" was used in the construction of kitchen, bathroom and boundary walls. The undulating surface of the blocks obviates the need for skilled masons. No mortar is needed in the horizontal joints, but one or two of the vertical holes have to be filled with mortar to ensure self-alignment. The rest of the holes are left empty to increase heat insulation (plates 5 and 6). Roofs are constructed of corrugated asbestos sheets on timber joists and rafters. House type (1) has a pitched roof and house type (2) has a flat roof. At the beginning, there were no ceilings but the occupants were encouraged to add ceilings as their financial circumstances improved. In fact, at the time of interviews, 8% of the houses in the sample had a ceiling fixed.

Electricity has been provided in the main road and a stand water pipe has been fixed at the outer wall of the compound, but further connections inside the house are the responsibility of tenants. Almost all tenants have made the necessary connections but a few (12%) have not completed water connections to the bathroom.

1.5 THE TENANTS

(i) PLACES OF BIRTH AND DATES OF MIGRATION

Less than 20% of heads of households in the sample were born in Khartoum North. The rest have immigrated to the town within the last 25 years, mostly from the Northern Province.[1] The great majority of them (91%) gave employment as the main reason for coming to the town; only 9% gave other reasons, mostly related to family.[2]

(ii) FORMER HOUSING

Before moving into the present houses, almost all the families had been resident in the three towns (Khartoum, Omdurman and Khartoum North) for a period of at least five years.[3] The majority of them had lived in rented property. The usual accommodation was a house, or part of a house, consisting of one or two bedrooms, plus the facilities (such as W.C. and bathroom), for which they had paid rents of between £4 and £8 per month.[4]

(iii) LENGTH OF RESIDENCE IN THE PRESENT HOUSE

More than 80% of the tenants had lived in the project for more than one year - half of them had been resident for a period of between 2½ to 5 years, and slightly less than

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1. See Appendix 5; Tables 2f and 2g.
2. See Appendix 5; Table 2h.
3. It was stated as one of the conditions qualifying for a house that the applicant should have been resident in Khartoum North (Appendix 1).
4. 39% had been living in one bedroom, 40% in two bedrooms and only 20% in more than two bedrooms; Appendix 5; 5b and 5c.

one-third for a period of between one year and 2½ years. The average length of residence at the time of the survey was around three years.[1]

(iv) TENURE

Every tenant had signed an agreement with the government that "he and his family were going to live in the house." Only two-thirds of the tenants did so; 20% completely sublet their houses to other families while 11% sublet part of their houses.[2]

Two main reasons explain why some families have sublet their houses. In the first place, monthly instalments, plus other monthly expenditure on running the house (such as electricity, taxes and water supply), account for about 40% of the average family income.[3] Some families, particularly those with relatively lower incomes, have consequently moved out to find cheaper residence in other areas, while others have sublet part of their houses to help them meet this expenditure. In the second place, the market rent value of the house is in fact higher than the instalments paid to the government. The maximum instalment paid to the government is around 6 Sudanese pounds per month, but the house can be sublet at monthly rents double this figure. Some

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1. Appendix 5; Table 6b.
2. Table 6a, Appendix 5 gives the distribution of houses in the sample by tenure. It is quite likely that the percentage of sublet houses is higher than is shown in the table; subtenants were found, in some cases, to act the part of owners because of fear from statutory control.
3. See later "The Economic Structure of the Household".

tenants, therefore, prefer to move out and become absentee landlords. Since the houses continue to be registered under their names, they act as intermediaries between government and sub-tenants. Of course, after the end of the amortisation period the houses will be part of their profits.

(v) NUMBER OF HOUSEHOLDS

Since some of the houses are partly sublet to other families, the number of families in the project is greater than the number of houses. In fact, in the 444 houses visited, there were 558 families; the average occupancy rate being 1·26 families per house.[1]

(vi) SIZE OF THE POPULATION

The total number of people in the houses visited was 3,690 and the average occupancy rate was 8·4 persons per house. On these bases the total population in the project was estimated to be about 8,400 people (nearly 10% of the population in the whole town of Khartoum North).[2]

(vii) AGE STRUCTURE

Table 2 gives the distribution of the population in the sample according to age. It can be seen that the population is mainly dominated by two age groups: children under 14 years of age (52%) and adults 26 to 40 years of age

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1. This figure includes branch families who had come to share the house (e.g. in the case of a married son and his wife and children who had come to share house with the parents); see later, "TYPES OF HOUSEHOLDS".

2. The population of Khartoum North was 80,010 people by 1964/65, DEPARTMENT OF STATISTICS, ibid.

(21%). About 20% of the total population are children born after rehousing.

This 'unbalanced' population structure resembles that observed in the typical new British community, such as Crawley New Town.[1] In both cases the population structure takes the form of 'peaks' and 'troughs', related to the stage in the development of the town (figure 7). This originates from the movement of two initial age-group peaks (0 - 5 years and 20 - 25 years), i.e. young married couples with young families. In the sample, however, this situation was to some extent evened out by the presence of lodgers, who were usually in their teens and early twenties.

TABLE 2

DISTRIBUTION OF THE POPULATION ACCORDING TO AGE

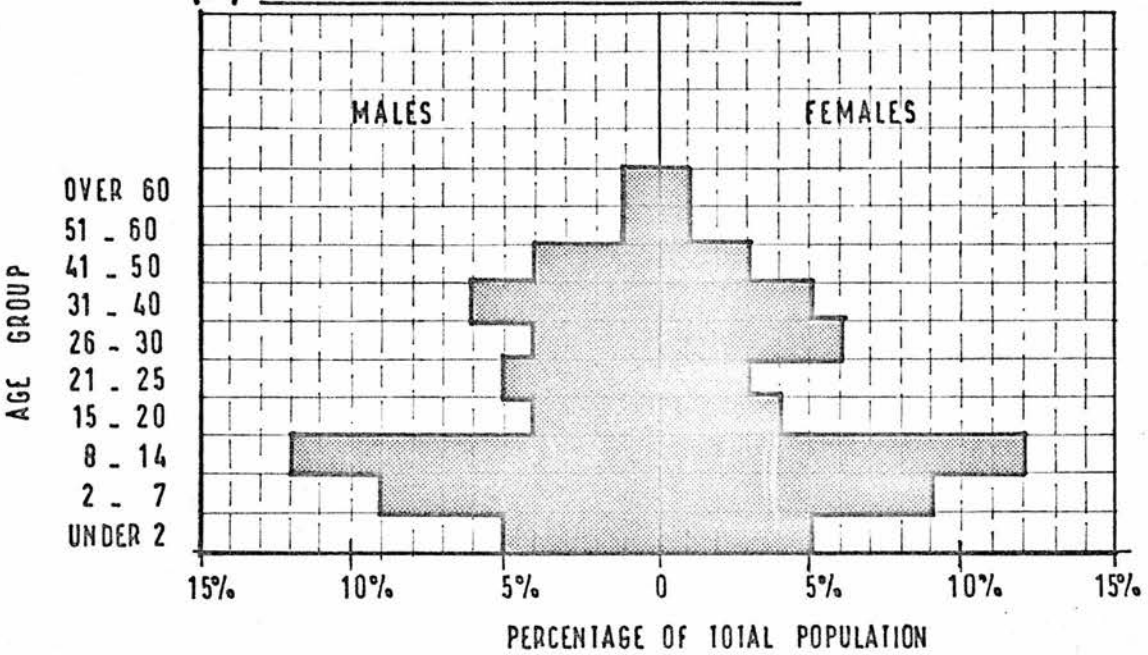
Age group	% of total population
Under 2 years	10%
2 - 7 years	18%
8 - 14 years	24%
15 - 20 years	8%
21 - 25 years	8%
26 - 30 years	10%
31 - 40 years	11%
41 - 50 years	7%
51 - 60 years	2%
Over 60 years	2%
All age groups	100%

1. GREATER LONDON COUNCIL (GLC) 'The Planning of a New Town." Hook Study, 1965, pp. 18-26.

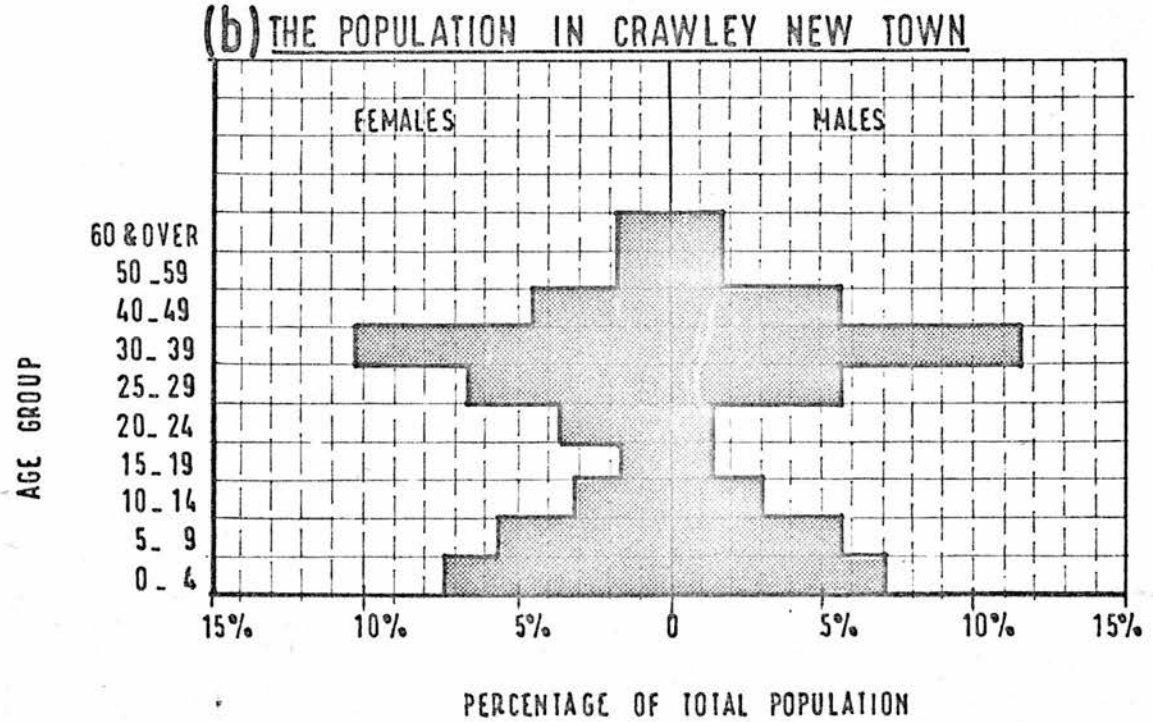
figure 7:

AGE STRUCTURE:

(a) THE POPULATION IN THE SAMPLE



(b) THE POPULATION IN CRAWLEY NEW TOWN



Sourse: The Planning of a New Town, GLC. 1965 P. 18

1.6 SUMMARY

Within the general purpose of providing some factual bases for the design and allocation of mass housing in central Sudan, this study is mainly concerned with aspects related to the provision and use of space in the home. It aims first to describe the users of mass housing and second, to appraise their requirements in relation to the type of housing presently provided by the government. Khartoum North Housing Project was taken for case study. The project, comprising 1,000 houses, was started by the National Housing Authority in 1961. Houses were built to standard plan types in standard plots of land and sold to the qualified tenants on hire-purchase terms.

The population is made up mainly of young married couples with children who have immigrated to the town and have lived in rented property before rehousing. At the time of the survey, most families had lived in the project for more than one year and the average length of residence was about three years. A few families had sublet their houses and left the project and a few others had sublet parts of their houses; 80% of the houses were found to be owner occupied but some of these were shared with other families.

The study was mainly based on the results of tenant interviews and field observations in the project undertaken by the author. Altogether, 444 houses were visited. A statistical summary of the results obtained from this sample is given in Appendix 5.

CHAPTER 2: THE SOCIAL STRUCTURE OF THE HOUSEHOLD

2.1 INTRODUCTION

Studies in African urbanisation point to the tremendous changes which have taken place in family structure and social life following the move to town. They emphasise more and more that with urbanisation the family size has become smaller, the individual family has gained more self-independence and the traditional family household has gradually been superceded by the nucleus family household as it has emerged in Europe and North America.[1] As most tenants in the sample had immigrated from villages and small urban centres, they were more likely to have experienced such changes. This section describes the types of households in the sample and examines the types of changes which have taken place. The effects of these changes on the spatial organisation of the dwelling will be discussed in the subsequent chapters.

It is essential for the discussion which follows to distinguish between the elementary family and the household. The former consists of husband, wife and their children; the latter consists of a person or group of persons living in the same house or section of a house and managing their

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1. See, for example:
MARRIS, P., "Family and Social Change in an African City: A Study of Rehousing in Lagos." Routledge & Kegan Paul, London, 1961, p. 100.
THE CENTRE OF AFRICAN STUDIES, UNIVERSITY OF EDINBURGH, "Urbanisation in African Social Change." Proceedings of the Inaugural Seminar held in the Centre, Edinburgh, January, 1963, pp. 59 - 90.

domestic affairs together.[1] The household is, therefore, more elastic than the elementary family as it may include an elementary family plus additional people (e.g. close relatives).

2.2 THE HOUSEHOLD STRUCTURE

(i) THE TRADITIONAL HOUSEHOLD

The traditional Sudanese household consists of three or more families occupying the same house, or different parts of the same house, sharing the same amenities and recognising the same loyalties. The individual in this household is interwoven in a mesh of kinship pattern in which he is expected to play a certain role. The physical structure of the traditional house is a reflection of the social structure of the household (figure 8). Such types of households are still dominant in most villages of Northern Sudan and the Gezira Area[2] and, until a few years ago, were also dominant in towns and urban centres. Overcrowding within the compound walls of the houses and the need for space somewhere else to house the 'overspill' gave rise to new types of households. In the town, this was speeded up by the increasing rate of immigration, particularly in recent years.

(ii) TYPES OF HOUSEHOLDS IN THE SAMPLE

Table 3 gives the distribution of houses in the sample

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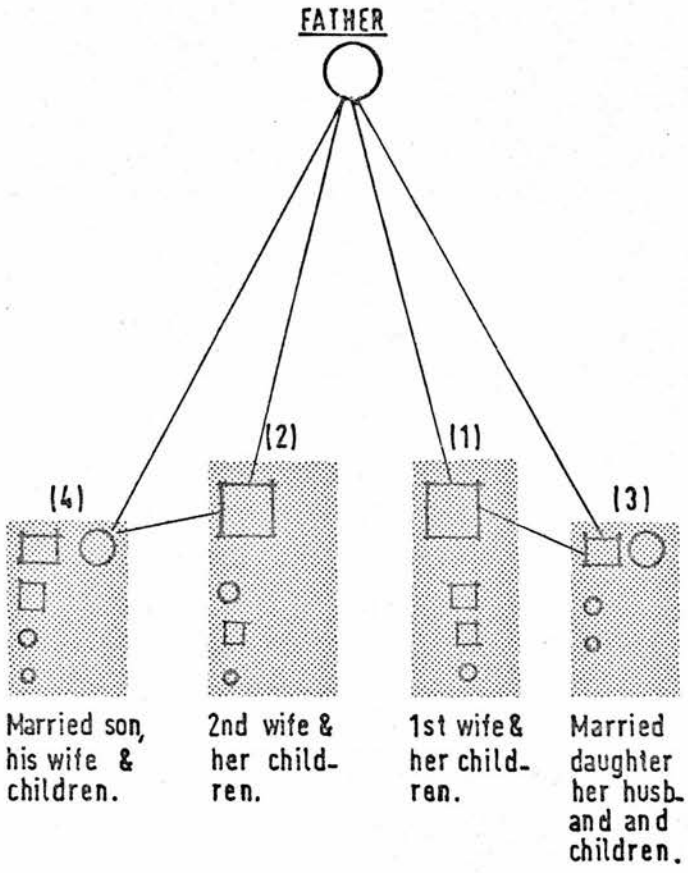
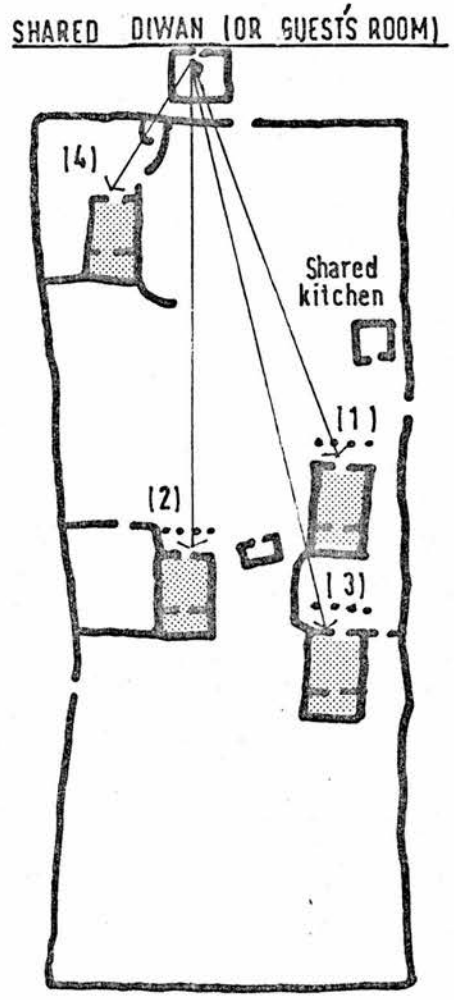
1. BRAUCH, CROOKE & SHAW, "Bashaqra Area Resettlement", University of Khartoum, 1964, pp. 112. See also MARRIS, Peter, "Family and Social Change in an African City."
2. BRAUCH, CROOKE & SHAW, ibid.

figure 8 :



THE SOCIAL STRUCTURE
OF THE TRADITIONAL HOUSEHOLD

AND



THE PHYSICAL STRUCTURE
OF THE TRADITIONAL HOUSE

according to types of households occupying them. Slightly more than half the houses (51%) were occupied by elementary families alone. The rest were shared; with lodgers (usually distant male kin who had come to town); with branch family units (usually married sons or daughters); or with unrelated family units who had come to rent parts of the houses.

TABLE 3

DISTRIBUTION OF HOUSES ACCORDING TO TYPE OF HOUSEHOLD

Type of Household	% of Houses
(1) Elementary family alone	51%
(2) Elementary family plus single lodgers	23%
(3) Elementary family plus branch family unit	15%
(4) Elementary family plus renting family	11%

(iii) THE HOUSEHOLD AND THE FAMILY LIFE-CYCLES

Further analysis showed that house-sharing was more common among young families and old families than among families at their middle stages of development (Table 4). This points to a trend among families in the sample to share or separate according to a repetitive pattern related to the stage in the family life-cycle. When the family is young and has few children, its space requirements are few and it tends to be absorbed by another main family branch. As the family develops, it reaches a stage when its size is large,

its structure complex and its need for space is at its maximum. At this stage the family tends to be on its own. Once the family has passed to its late stages, and grown-up children have married, the family starts receiving lodgers, or, more likely, some of its own married children will come back with their partners.[1]

TABLE 4

DISTRIBUTION OF SHARING* FAMILIES ACCORDING TO STAGE IN FAMILY DEVELOPMENT

Stage in Family Development	Assumed Age of Head of Household	Sample	% Sharing
Young	Under 30 years	89	33%
Middle	31 - 40 years	170	20%
Late middle	41 - 50 years	133	15%
Old	Over 50 years	47	36%

*Families with 'single' lodgers not included.

We must, therefore, distinguish between two cycles taking place simultaneously; the household cycle and the elementary family cycle. This distinction is important, particularly as it affects the need for space in the home. In the case of the elementary family cycle, the need for space varies with family development. In the case of the household cycle, the space needs do not change; rather it

1. These observations were confirmed by the surveys of Khartoum New Extensions and the New Deims. For example, in Khartoum Extensions 55% of young families and 35% of old families were sharing with others, while less than 20% of families at their late middle stages were sharing.

is the household itself which changes. In other words, instead of manipulating the space to suit the needs of the household, the latter is usually being manipulated to suit the available space. This manipulation takes place through the integration of lodgers and branch family units when the size of the house permits, or the 'shedding out' of these units when it does not. There were, of course, some cases where this manipulation did not take place and the result was overcrowding.

House-sharing is not usually approved of by housing authorities because of its association with overcrowding and lack of privacy.[1] But the house designed for a growing family of a certain size is deemed to be overcrowded (or under-occupied) for a major part of its life-time (figure 9a). This natural trend among families to share and separate at different stages in their life-cycles provides a good chance for an optimum utilisation of the dwelling space (figure 9b).[2]

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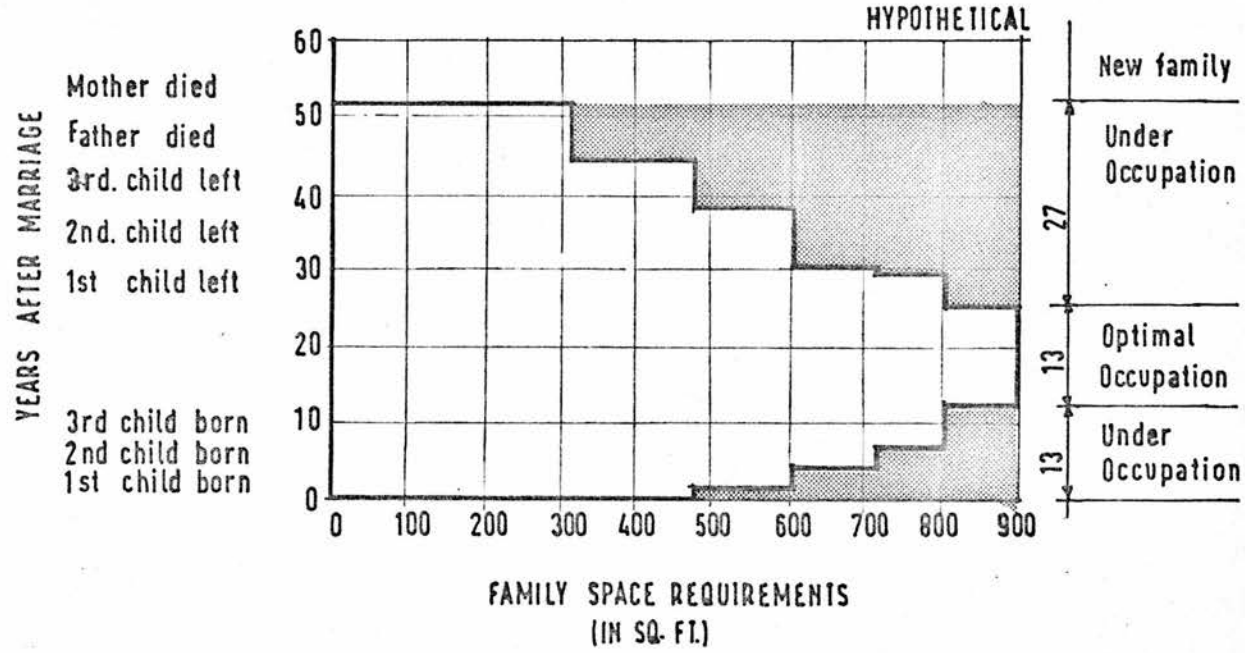
1. See HMSO, "Report of the Royal Commission to East Africa", section dealing with "HOUSING", London, 1953 - 1955.
   See also:
   Proceedings of the CCTA Conference on 'Housing and Urbanization, Nairobi, Jan. 1959, pp. 144 - 150.

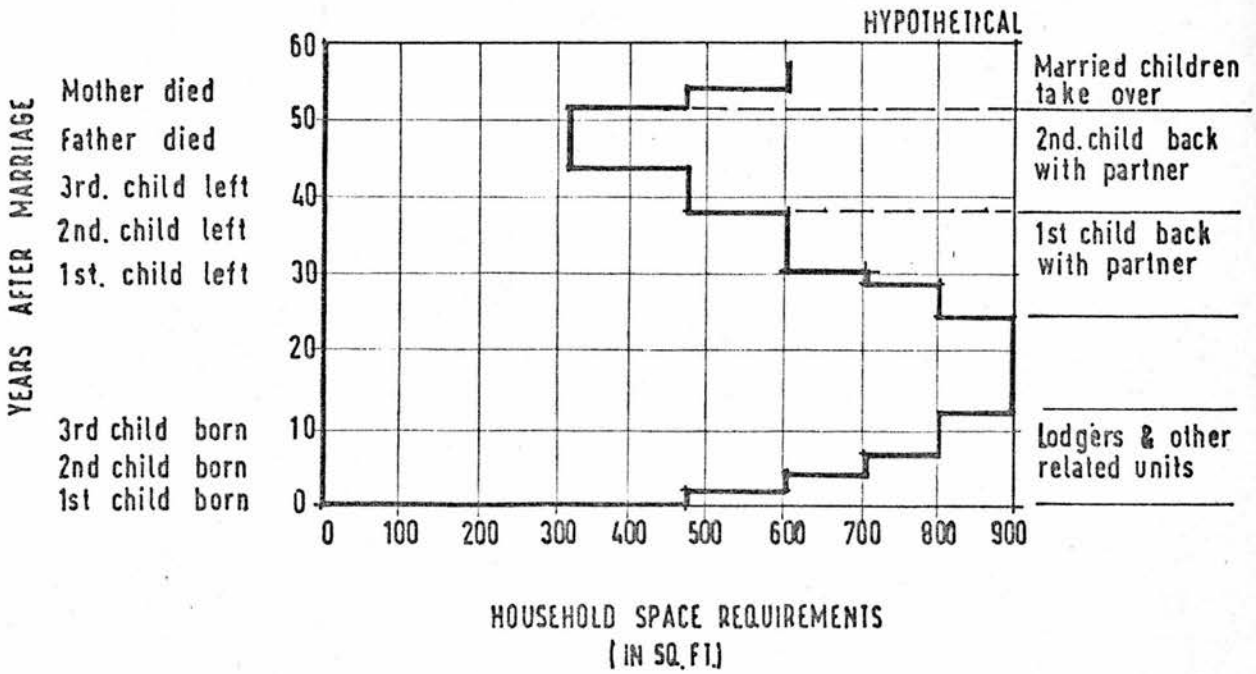
2. There are various other arguments for sharing and taking lodgers. It was reported in a survey of Kaduna, Nigeria, that "both the economic need and the social desire (brought) many people not closely related to share accommodation and live as one household. This type of household under more ideal conditions may need a larger number of rooms than its equivalent size consisting of close family only". One can add that sharing may also reduce total housing needs. See, MAX, LOCK & PARTNERS, "Kaduna, 1917, 1967, 2017." A survey and plan of the capital territory for the Government of Northern Nigeria. Faber & Faber, London, 1967.

figure 9:

(a) THE FAMILY CYCLE AND THE UTILIZATON OF DWELLING SPACE



(b) THE HOUSEHOLD CYCLE AND THE UTILIZATION OF DWELLING SPACE



(iv) THE COMPOSITION OF HOUSEHOLDS

The size of household varied from under five persons to over fifteen, the average being 8·4 person per household (figure 10). This average is two persons higher than that for the whole town of Khartoum North (6·3 persons per household).[1] The reasons for this relatively larger size of household in the sample can be attributed in part to the frequency of lodgers and lodging families (as has been shown earlier), and in part to the fact that the houses had been allocated to young growing families. In fact, about 20% of the total population in the sample were young children born after rehousing. Also, at the time of the survey 60% of heads of households were aged 40 years or under and it is most likely that this average will soon be around 9 persons per household.

This relatively larger size of household seems to have produced a lot of discontent among the tenants with the sizes of their houses. It will be shown later that over half the tenants were dissatisfied with the sizes of their plots and an even larger proportion were dissatisfied with the number of rooms; the most important reason given being the size of household.[2]

To examine the sex and age composition of different households in the sample the following broad categories

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1. THE DEPARTMENT OF STATISTICS, Population and Housing Survey, Khartoum North, 1964/65, gave the following figures:

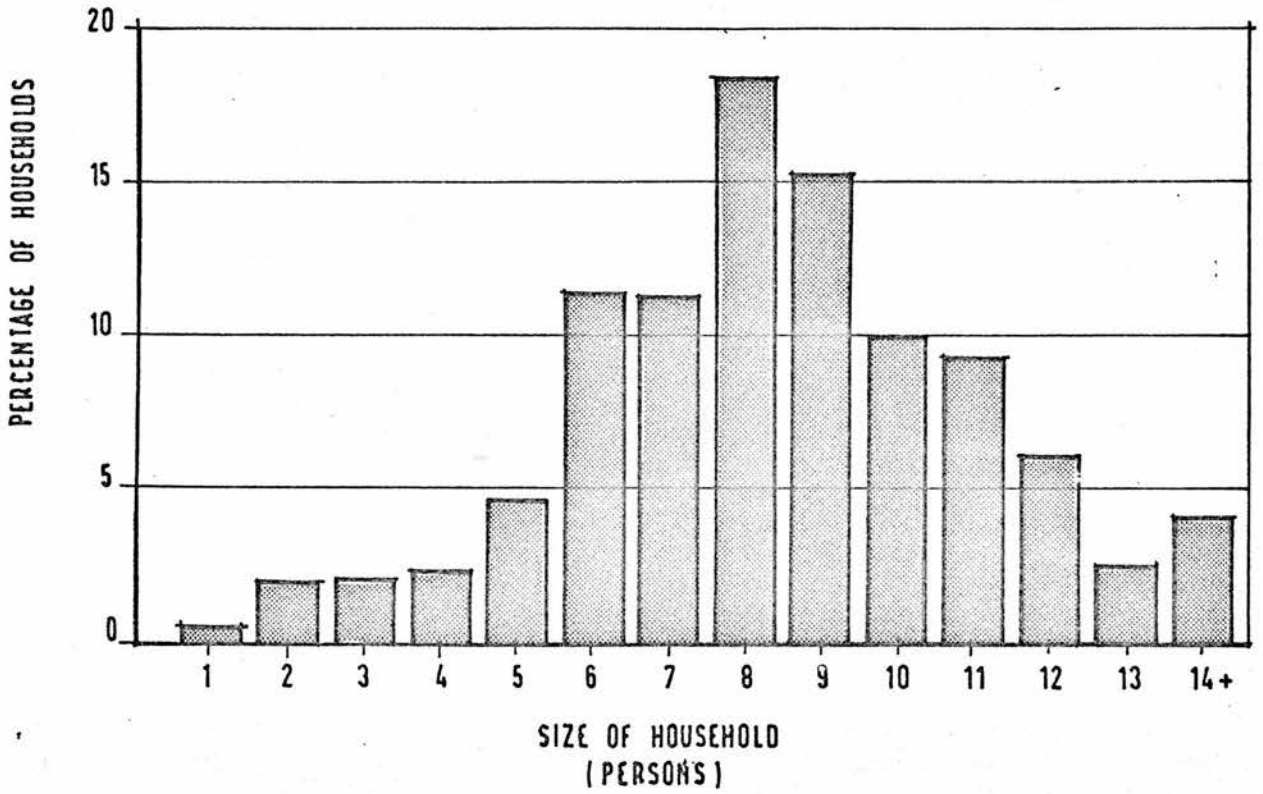
Average size of household in 1st class areas	4·6
2nd class areas	7·3
3rd class areas	6·8
whole town	6·3

2. See, RESPONSE TO THE HOUSES, Chapter 4.

figure 10:

DISTRIBUTION OF HOUSEHOLDS IN THE SAMPLE ACCORDING TO SIZE

SIZE OF SAMPLE = 444 HOUSEHOLDS



Average number of persons/household = 8.4

were recognised:[1]

(1) Parents

(2) Children under 7 years (i.e. under school age)

(3) Children 7 - 14 years (i.e. under puberty)

(4) Males over 14 years (i.e. adult males)

(5) Females over 14 years (i.e. adult females)

Figure 11 gives a breakdown of households in the sample according to different combinations of the groups listed above. It can be seen from the figure that most households in the sample have complex structures (i.e. they include at the same time members of opposite sexes belonging to different age groups). For example, just under one-third of the houses (32%) were occupied by households with members in all five age and sex groups. Another 22% have all age groups except for either adult males or adult females.

This complexity of household structures raised questions of privacy between sexes, particularly with regard to outdoor sleeping arrangements. Despite the fact that each house provided two separate compounds, some tenants had further subdivided these compounds by adding walls, screens and hedges. Moreover, almost one-third of the tenants remarked that the layout of rooms in the house did not offer sufficient privacy between sexes. The relation between the

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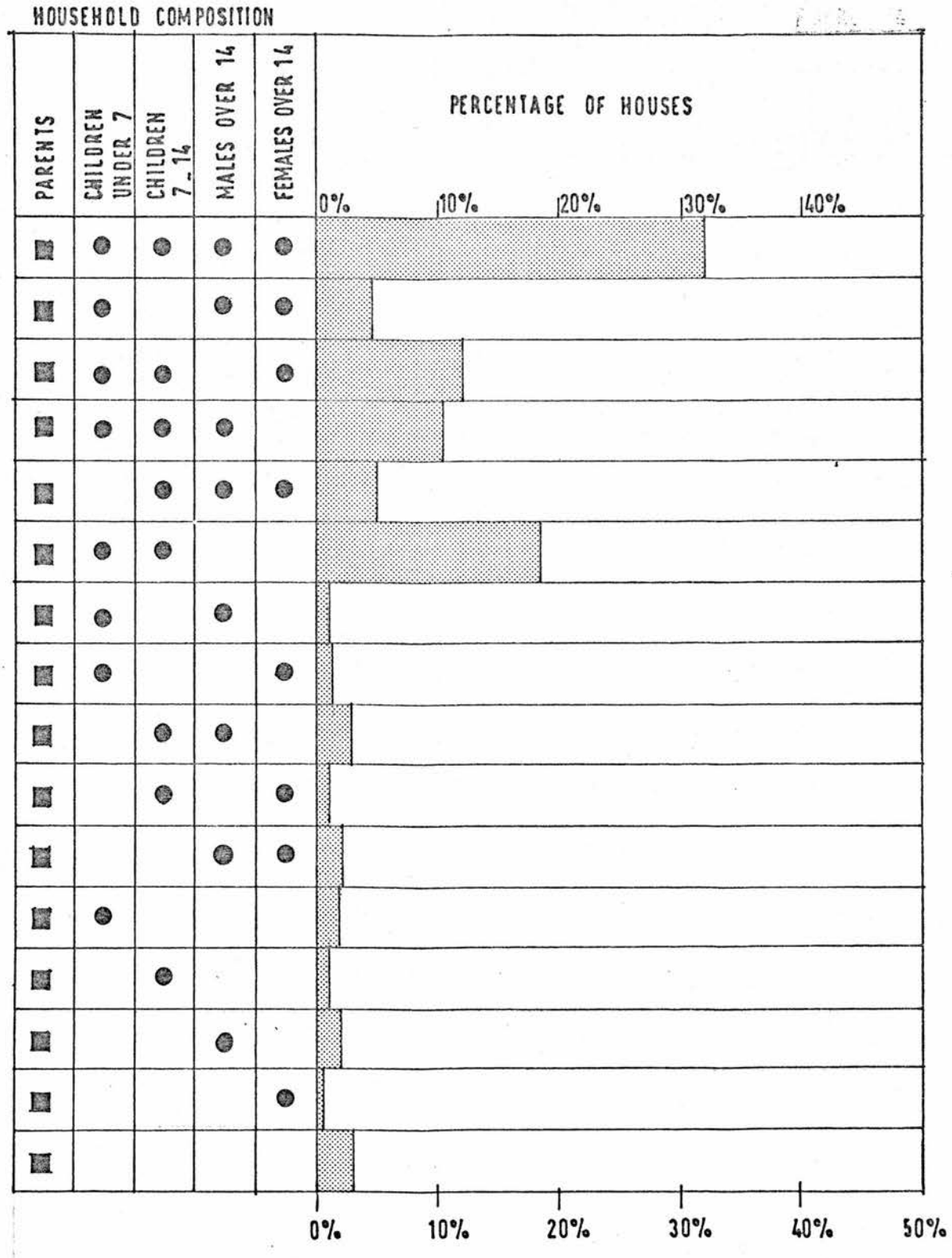
1. This breakdown attempts to define certain groups of occupants, the presence or absence of which is likely to affect the provision and layout of space in the home. Studies concerned with the population structure can and do distinguish between the two variables of age and sex. In this case, however, it was found unnecessary to treat them separately except in the case of adult males and adult females.

figure 11:

DISTRIBUTION OF HOUSES ACCORDING TO COMPOSITION OF OCCUPANT HOUSEHOLDS

(SAMPLE = 444 HOUSES)



household structure and attitudes expressed about the house will be considered in more detail later.

(v) HEADS OF HOUSEHOLDS[1]

Although the qualifications for a house make no reference to the applicant's sex, the sample showed 98% of heads of households to be men; only in eight cases did women have this role and these were all either widowed or divorced. This is, of course, due to the prevailing social traditions which reflect themselves in the domination of male-folk in all matters connected with the relationship of the family to the outside. Also, by tradition, the head of household is the breadwinner, whether that be the husband or a grown-up son; among this population women rarely go to work. In the sample, only 3% of housewives had outside employment.

The majority of heads of households were aged between 30 and 40 years, and the median age was 39 years. Table 5 gives the distribution of heads of households in the sample

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1. The definition of head of household raises some difficulty. Officially, he is considered the person under whose name the house is registered and with whom lies the responsibility of paying rent, taxes, etc. Socially, he is recognised as the person under whose protection and control come the individuals within the household. Economically, he is usually the person who gives financial support. Although, in most cases, these definitions coincided in the same person, situations arose where the person who shouldered the financial responsibility was different from the one who gave the social control and support (e.g. in cases where grown-up children provided the financial support while the father remained social head of household). In this analysis the head of household was taken as the person under whose name the house was registered.

according to age group. The table also shows the headship rates for these groups.[1]

TABLE 5

DISTRIBUTION OF HEADS OF HOUSEHOLDS ACCORDING TO AGE GROUPS

Age Group (in years)	Total Number of Males in the sample (1)	Heads of Households (2)	Headship Rate $\frac{(2) \times 100}{(1)}$
21 - 25	182	25	14%
26 - 30	154	72	47%
31 - 40	202	170	84%
41 - 50	146	130	89%
51 - 60	48	31	65%
Over 60	22	8	37%
Total	754	436	58%

Just under 60% of the males in the sample, aged 20 years and over, were heads of households; the 30 - 50 age group had the highest headship rates.

2.3 THE GROUPING OF RELATIONS WITHIN THE HOUSEHOLD

The average family way of life is derived from long established Sudanese and Islamic traditions. Almost all heads of households in the sample were Muslims and many of them observed the rules of Islam, such as saying prayers five

1. Headship rate is defined as the percentage of the population, or any group within it, who are heads of households.
See, D.V. DONNISON, "The Government of Housing", London, 1967, pp. 30 - 31.

times a day and keeping Ramadan. More than three-quarters of them had come from villages and small towns in Northern Sudan where the traditional family system was not much affected by modern urban trends.

In this traditional system, women are valued and respected; they are considered as 'precious property' and prohibited from sight by strangers. For this reason, the man assumes the rule of guardian and protector of his womenfolk. "Women marry into their husband's families and live in the compounds of their Lineage."[1] The woman recognises her loyalty, not only to her husband, but also to the rest of his family.

The grouping of family relations is much influenced by the pattern of living outside the family compound. Men come together to work in the farm, to discuss disputes and to participate in weddings and funerals. Women also have occasions on which they come together. The individual family is 'society orientated'; the man spends most of his day out of the home mixing with other men of the household or tribe and the wife finds her companions among other women. Wife and husband rarely mix together or eat together during the day because they consider themselves part of a big household or a big society towards which they have certain obligations and certain roles to play. The society itself is conscious of segmentation of sexes. The traditional

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1. A similar pattern was observed by Peter Marris among the Yoruba tribes of Nigeria; see, MARRIS, P., ibid., p. 15.

compound is not far different from that observed by Peter Marris among the Yoruba tribes of Nigeria:

> "Each of the family compounds in the traditional Yoruba town housed a lineage, or part of a lineage, tracing its descent from the same male ancestor. The rooms would be arranged round the four sides of the courtyard, with a single gateway. Opposite the gate, were the private room and parlour of the most senior member of the family, while his married children his brothers with their wives and children, and the other relatives and dependents would occupy the rooms on either side: there might be quarters for strangers by the gate."[1]

Compared to the above, households in the sample had certainly gained more self-independence. New loyalties and new institutions were gradually emerging in the community, but these seem to have less impact in shaping the internal relations within the unit household. The man and his wife can and do have meals together; most of their free time is spent at home with their children listening to the radio or having informal talks. When visitors arrive they are entertained by the whole family, or, more often, they are taken to the 'guest room', depending on their type of relationship. On the whole, the individual family and household have gained more privacy and become more 'home oriented'.

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1. MARRIS, P., ibid., p. 13.

(i) SECLUSION OF WOMEN

The man is still conscious of the 'seclusion' of his womenfolk and complaints were often heard that "the compound walls are too low", and that "the front door is facing the windows to the women's rooms", etc. However, 'seclusion' of women in the Sudanese society, as the late Saad El Din Fawzi explained:

> "certainly does not mean the division of the members of the same household into males and females, who, though residing together, have virtually separate lives.....Seclusion is valid only for one sex in relation to the 'stranger' or 'outsider' of the opposite sex."[1]

To explain the concept of the 'outsider' used in this sense, Fawzi gave the example:

> "I might be on very good terms with my life-long neighbour, but I am still a stranger to his womenfolk and must be treated accordingly....."

(ii) THE CHILDREN

Parallel with this independence for the whole family, there is more independence for the children; other than the father being keen on sending his children to school and looking after their well-being, there is little interference from the parents. Families in the sample seemed to take much pride in bringing up their children "the proper way"

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1. FAWZI. S., ibid., p. 77.

and complaints were often raised about the shortage of schools in the neighbourhood. Young children spend their time between school and playing with other children in the neighbourhood or listening to their favourite programmes on the radio. They sleep with their parents in the family compound, but separate arrangements are made for adult children. Adult daughters not at school stay at home for most of the day and help their mothers in household tasks. Occasionally they visit other women friends in the neighbourhood, but frequent outings by women are considered improper.

(iii) THE LODGERS

For the sharing families and families with lodgers, the usual arrangement is for members of the two families to 'live together' for most of the day. Household tasks and household expenses are usually shared between members of the two families, but eating habits are somewhat reminiscent of those in the traditional household. Adult males of the two families have their meals together and adult females together. The two families usually separate at night, where the branch family occupy a separate room in the compound. Most sharing families were found to have certain forms of ties (e.g. kinship, village, tribe). In the few cases where no such ties existed, the lodger family usually rented the part of the house it occupied. In such cases the two families function as separate households: the women perform their household tasks independent of each other and the kitchen is used by each housewife in turn. The two households take their meals separately.

2.4 THE HOUSEHOLD AND THE COMMUNITY

Among residents in the scheme, there seem to be a strong feeling of community. For the casual observer who goes round the scheme about 5 o'clock in the evening, this feeling is reflected in various forms of group activities. Almost all streets and, (to a lesser extent,) open spaces are crowded with groups of children playing football or groups of men saying their evening prayers. Here and there in the streets or open spaces among the houses is planted a large tent, overcrowded with men who are celebrating a wedding or have come to offer their condolences in the case of a funeral. In the houses at one side of the tent are groups of women who have come to take part in the same occasion. Occasionally, four or five men are seen in front of the main door, opening into one of the compounds, sitting in light plastic armchairs and having their evening black tea. Passers-by see no harm in joining the group since 'everybody knows everybody'. When, in the late evening, the meeting is over, the chairs are stacked one on top of the other and taken inside the house to be stored in one corner of the guest-room till the next evening.

Casual visits are exchanged between families without the need for invitations or arrangements. Matters concerning the community are discussed and the news is passed round very quickly.[1] Although people in the scheme are aware

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1. Just one day after the start of this survey, almost everyone in the scheme seemed to have heard about it and formulated an idea about the type of questions asked.

of their identity as such, occasionally tensions are felt to exist between rival political or tribal groups. The complaint was made that the community club, for example, was dominated by 'Muslim Brothers' and that this prohibited some people with 'leftist views' from joining in. There were also some societies bringing together people who came from the same place of birth or shared the same tribal affiliations. 10% of heads of households were members of tribal groups and 23% were members of village groups.[1]

(i) NEW SOCIAL INSTITUTIONS

These traditional groups seem to be gradually replaced by new types of institutions, particularly among the younger generation. These new institutions are aimed mostly at the welfare of the whole community and their membership is the right of everyone, irrespective of his tribal or ethnic background. More than 80% of the households in the sample had one or two of their members participating in a welfare society; 28% had one or two of their adult male members participating in a social club, and 18% in each of the co-operative societies and athletic clubs.[2]

There are many social and economic reasons behind the rise of these new institutions. Foremost among these is the awareness among families that they share the same backgrounds of tribe, village, lineage or simply low income and urban suppression. The shared amenities of open spaces,

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1. A group of people coming from the same village or town.
2. Table 8a, Appendix 6.

shopping areas, schools, clubs, etc. provide platforms for them to develop more universal forms of societies and institutions.[1]

Although new forms of urban affiliations, such as the welfare society, the social club or the athletic club, are gaining momentum, it seems that most residents still maintain close ties with their home villages.

(ii) RELATIONS WITH PLACE OF BIRTH

Ties with place of birth took various forms. Discussions with male heads of households showed that most of them had spent their last holiday in their home villages. Some mentioned that they had sent money to the rest of their families (parents or other close kin) and that they had frequently sent letters to and received letters from home. Very few said that they would like to go back after retiring; the most important reason behind this was the fact that they felt settled, with children to look after, permanent jobs to maintain and houses that would soon be their own. Indeed, many of them expressed the desire for other members of their parent families to come and join them permanently in the town. They were pleased that relatives, or even people from the same village, should come and stay with them for

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1. It seems that there is a strong connection between the size of the community and the strength of the ties between its members. Although it is difficult to test the validity of this statement for the whole project, it was observed that there are more frequent meetings among the inhabitants of the residential community (about 60 houses) sharing the same open space than among the residents of two such groups with different open spaces.

some time. The high incidence of lodgers observed in the sample was one witness of this. The other was that 35% of families in the sample had said they received guests staying overnight at least once a month.[1]

2.5 SUMMARY.

Two main points which emerge from the above analysis have wider implications on the provision and use of space in the home:

The first is that a new type of household is gradually emerging. This new household is based on the elementary family, plus the lodger or the lodging family. About half the families in the sample were found to have taken in lodgers and branch family units. These were sometimes taken in irrespective of whether the size of house permitted or not. As a result, there were problems of over-crowding and lack of privacy between different groups in the household and there was a general level of discontent with the houses. There are, however, various social and economic reasons which motivate families to share and there are good reasons to believe that this trend will continue.[2] This may mean relatively larger houses, but it certainly means fewer houses than would otherwise be required. The issue is not only one of numbers and sizes of houses but also of the sub-division of the individual house to achieve sufficient privacy

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1. Appendix 6, Table 8b.
2. Over half the tenants expressed further desire to share, but some of them remarked that they could not because the size of the house did not permit.

between different age and sex groups in the household.

The second point is connected with the change in outlook to family, home and society. Relative to the breakdown of the traditional household and its replacement with this new type of household, there has been a restructuring of the traditional affiliations. The individual family has gained more self-independence and its members seem more conscious of their identity. They have more time to spend at home, more functions to perform as a unit and for these they demand more space and more privacy. At the same time new social institutions are arising outside the home and these, too, will need careful allocations of communal spaces.

CHAPTER 3: THE ECONOMIC STRUCTURE OF THE HOUSEHOLD

3.1 INTRODUCTION

One of the qualifying criteria for a house was that the applicant should be "in receipt of a salary plus cost of living allowance not less than £S12 and not more than £S25 per month."[1] This section attempts to examine three main points:

(i) How many of the tenants in the sample still comply with this criterion,

(ii) What proportion of their incomes they had to allocate for housing, (e.g. in rent, taxes) and for other related facilities (e.g. transport to place of work, maintenance of house),

(iii) How does the above definition of a low income earner relate to income levels in the rest of the urban areas of central Sudan.

The section also discusses in some detail some of the implications of the present government policy with regard to housing standards and cost of housing, the definition of the 'low-income earner', the financial system, etc.

3.2 OCCUPATIONS AND INCOME LEVELS

Most of heads of households in the sample were skilled and semi-skilled manual workers who were employed as mechanics, drivers, foremen, carpenters, etc. A little

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1. Appendix 1.

less than 20% were employed in clerical jobs. They worked in various governmental, commercial and industrial establishments in the three towns; 53% in Khartoum North, 40% in Khartoum and the rest in Omdurman.

At the time of the interviews, (three years after re-housing) salaries of heads of households in the sample varied from under £S10 to over £S60 per month and the average salary for the whole sample was around £S23 per month. Table 6 gives for each house type the distribution of heads of households according to monthly salary. It will be noticed that heads of households in house type (1) had generally higher incomes than those in house type (2). In fact, 80% of heads of households in house type (1) had salaries over the average figure (£S23), compared with only 20% of those in house type (2).[1] The average monthly salaries were £S29 and £S18 for house type (1) and type (2) respectively.

In terms of household income (as distinct from the salary of the head of household), the figures were even higher. That is because some households had more than one income earner[2] and others had one income earner, but with more than one source of income. In house type (1), for example, nearly one-third of heads of households had other sources of income; some had additional jobs while others received

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1. It will be remembered that house type (2) had been allocated to those with monthly salaries £S12 - 18 and house type (1) to those with monthly salaries £S19 - 25.
2. The average working force is 1·6 persons per house.

financial assistance from economically active members of their households (e.g. grown-up children, lodgers and

TABLE 6

DISTRIBUTION OF HEADS OF HOUSEHOLDS ACCORDING TO MONTHLY SALARY

Monthly Salary (in Sudanese Pounds)	House type (1) %	House type (2) %
Under 10	0	1
10 - 15	3	23
16 - 20	7	40
21 - 25	17	15
26 - 30	31	10
31 - 35	18	3
36 - 40	11	3
41 - 50	6	3
51 - 60	3	1
Over 60	4	1
TOTAL	100%	100%

young families renting part of the house).[1] This additional income ranged from £S5 to over £S20 per month, but in the majority of cases it was between £S5 and £S10 per month.

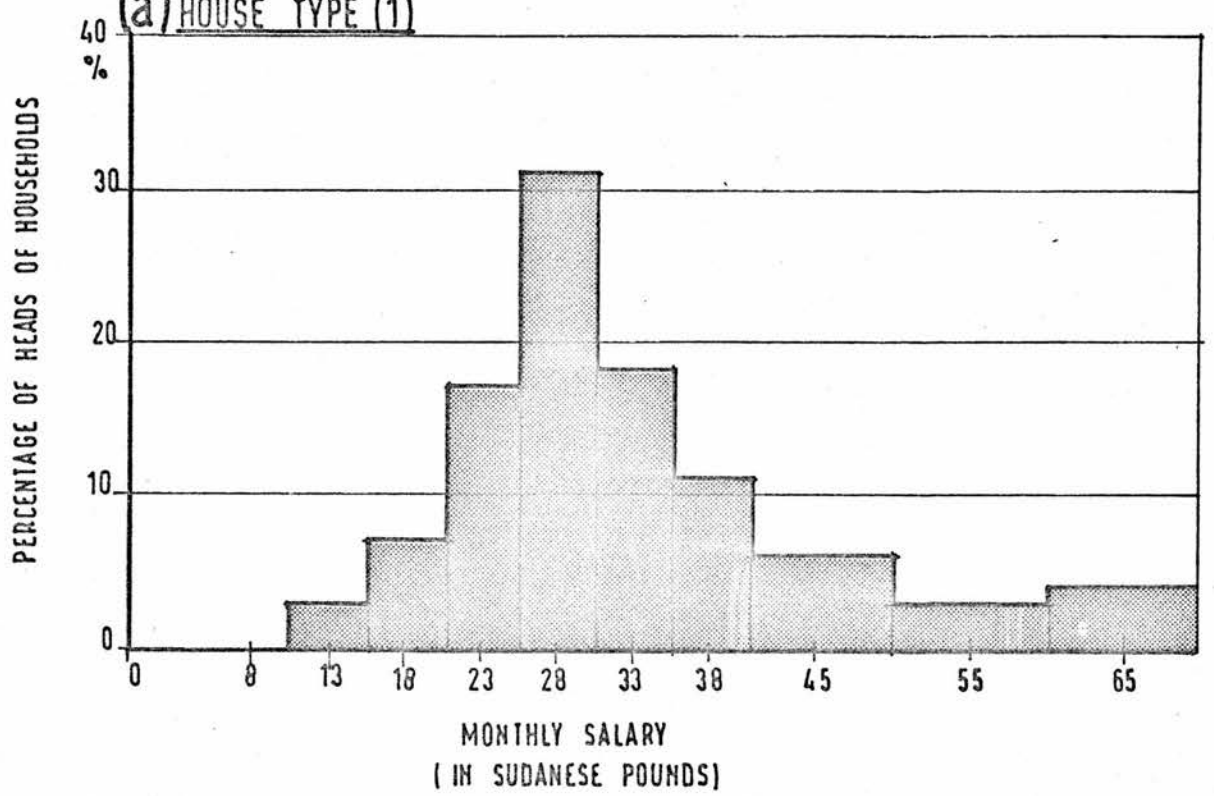
3.3 THE DISCREPANCY BETWEEN THE ORIGINAL DEFINITION AND THE LEVELS OF INCOME IN THE SAMPLE

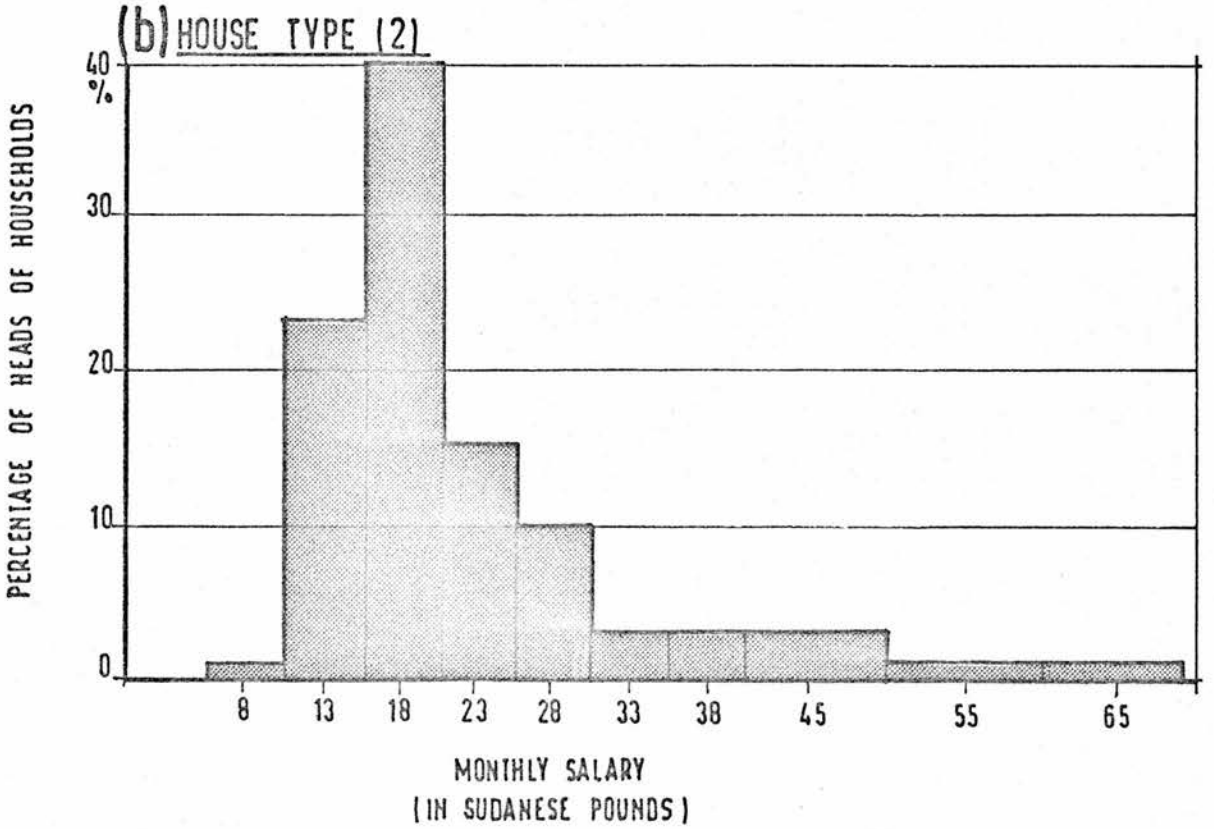
The first point to emerge from the above analysis is that there was a considerable lack of homogeneity in household

1. For further details see: Appendix 5, Tables 4b and 4c.

figure 12

DISTRIBUTION OF HEADS OF HOUSEHOLDS ACCORDING TO MONTHLY SALARY





incomes, not only between households in the two house types, but also among households occupying the same house type, (figure 12). In fact, the range was about 1:10 between the poorer families earning about 10 pounds per month and the richer families earning over 90 pounds per month. There was, on the whole, a considerable discrepancy between the original definition of the low-income earner and the levels of incomes observed in the sample. It seems that since the allocation of houses, the incomes of heads of households have risen considerably. Even when taking no regard of additional incomes, 72% of tenants in house type (1) and 62% of tenants in house type (2) had monthly salaries higher than the specified maximum limits; (figure 13).

No doubt part of this increase can be attributed to factors such as rises in the standard of living or changes in the value of the pound which had taken place.[1] But it seems also that a considerable part of this increase is accounted for by natural increases in the salaries of heads of households. This is particularly true amongst the younger ones who become more highly paid as their experience and skills develop. The result, however, is that the houses, originally meant for tenants with incomes £S12 - 25 per month, are, after less than five years, mostly occupied by tenants with monthly incomes two or three times as much. This implies that even if we consider changes in income due to

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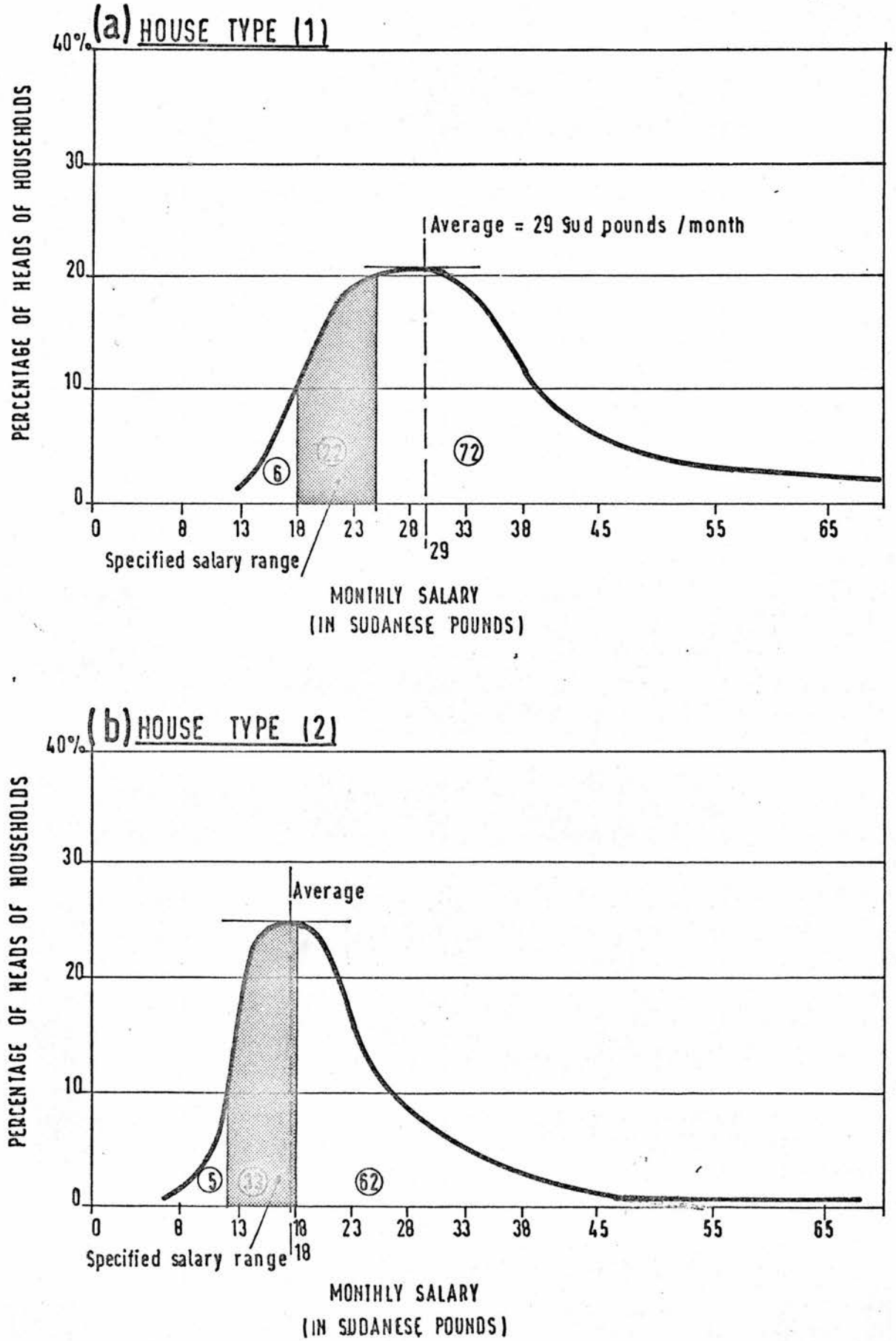
1. The cost of living index of the Sudanese low-salaried staff had risen from 165·6 in 1962 to 172·2 in 1965; See; THE REPUBLIC OF THE SUDAN, "Sudan Almanac", Khartoum, 1965/66.

figure 13:

PRESENT SALARIES IN RELATION TO ORIGINAL DEFINITION



such factors as inflation and change in the value of the pound, etc., there would still remain more than half the tenants in the sample who could not be considered as low-income earners by our own definition.

3.4 THE DEFINITION OF THE LOW-INCOME EARNER RELATED TO LEVELS OF INCOME IN URBAN AREAS

It is now time to consider the definition itself; how did it relate to the general levels of incomes in the rest of the urban areas of central Sudan and in Khartoum North, where the project itself was built?

The national statistical data available on levels of income in urban areas give the distribution by income of the economically active people and the distribution by total income of households.[1] Neither of these is completely adequate for the purpose of the present study which is mainly concerned with monthly income of head of household alone. The incomes of those who were economically active will include incomes of young, inexperienced employees in urban areas who are not heads of households and who are, by virtue of their age and experience, likely to be in receipt of low incomes. If, on the other hand, we take household incomes to compare with heads of households in the sample, this will mean relating the income of 1·8 persons[2] in urban areas to

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1. DEPARTMENT OF STATISTICS, "Population and Housing Surveys." 1964/65, Table 26.
2. The average working force per household in the six major towns of central Sudan was 1·8 persons; see, DEPARTMENT OF STATISTICS, ibid.

the income of 1·0 person in the sample (the head of household).

It was considered worth while however to compare the incomes of heads of households in the sample with those of economically active people in the rest of urban areas of central Sudan and in Khartoum North.[1]

The cumulative frequency diagram (figure 14) compares the distribution by income of heads of households in the sample (each house type separately) with the distribution by income of those who were economically active in the rest of Khartoum North and in six other major towns of central Sudan.[2] From the figure it will be seen that:

(1) In urban areas of central Sudan there were few people with very high incomes compared to a large majority with relatively low incomes.

(2) In urban areas of central Sudan, 80% of those who were economically active had incomes below £S25 per month, compared with 80% of heads of households in house type (2) and only 35% of those in house type (1).

(3) Accepting the National Housing Authority's definition of a low-income earner as someone with a monthly income in the range of £S12 to £S25, then 30% of the economically active population in urban areas of central Sudan would comply with this

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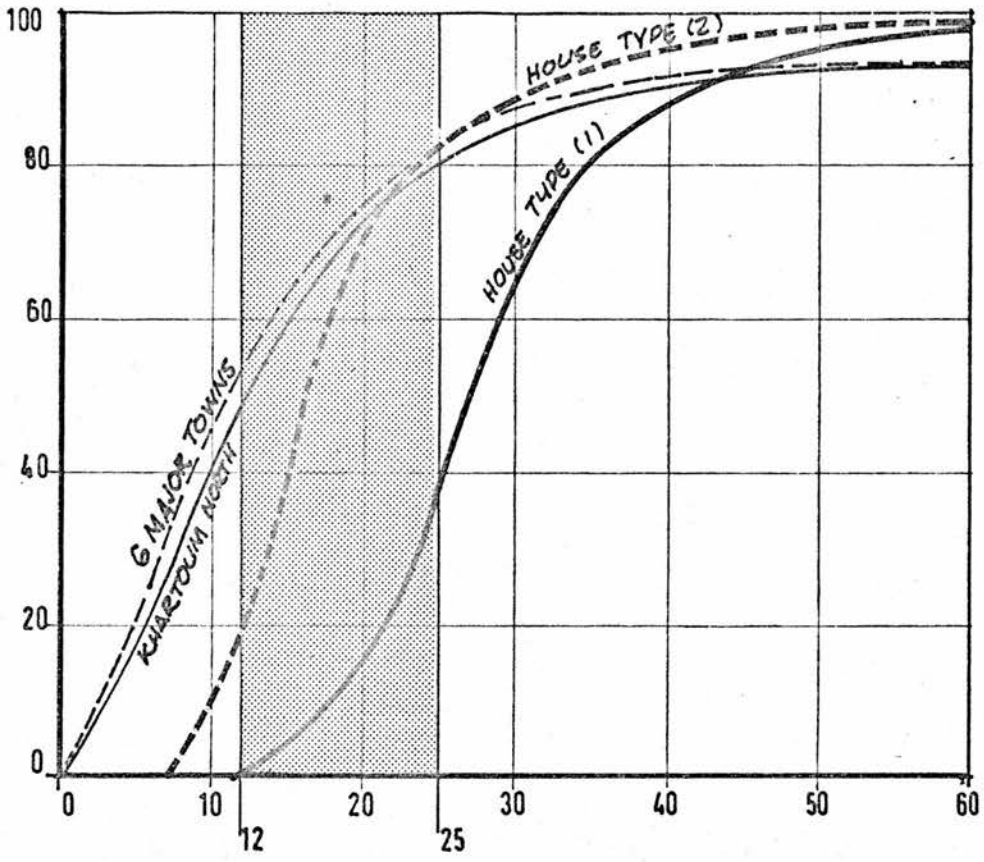
1. Bearing in mind that in these urban areas young inexperienced employees constitute a small proportion of the population. For example about 10% of the economically active population in Khartoum North are under the age of 20 years.

2. The six major towns are: Khartoum, Omdurman, Khartoum North, Wad Medani, Atbara and El Obeid.

figure 14:

COMPARISON OF INCOMES OF HEADS OF HOUSEHOLDS WITH INCOME PER PESON EMPLOYED IN MAJOR TOWNS OF CENTRAL SUDAN



definition while some other 50% would be "below the low-income group".

Even if we assume that the incomes of all economically active members of the individual household were brought together and made available for household expenditure - a false assumption[1] - it would still be found that half the urban households would either be considered as "low-income" or "below low-income"; (figure 15).

It was not the object of this discussion to redefine what the low-income earner should be. This is a political decision outside the scope of the present study. Instead, the object was to relate the economic definition of the low-income earner to the rest of the urban society[2] in order to provide some insight into its implications and some guidelines for a more realistic definition which takes consideration of both the economic and social structure of households in urban areas of central Sudan. If the low-income earner was defined in such a way that the majority of urban families could be classified as such, then a point will be reached when the whole society is subsidising the whole society. If, on the other hand, maximum and minimum limits of incomes were

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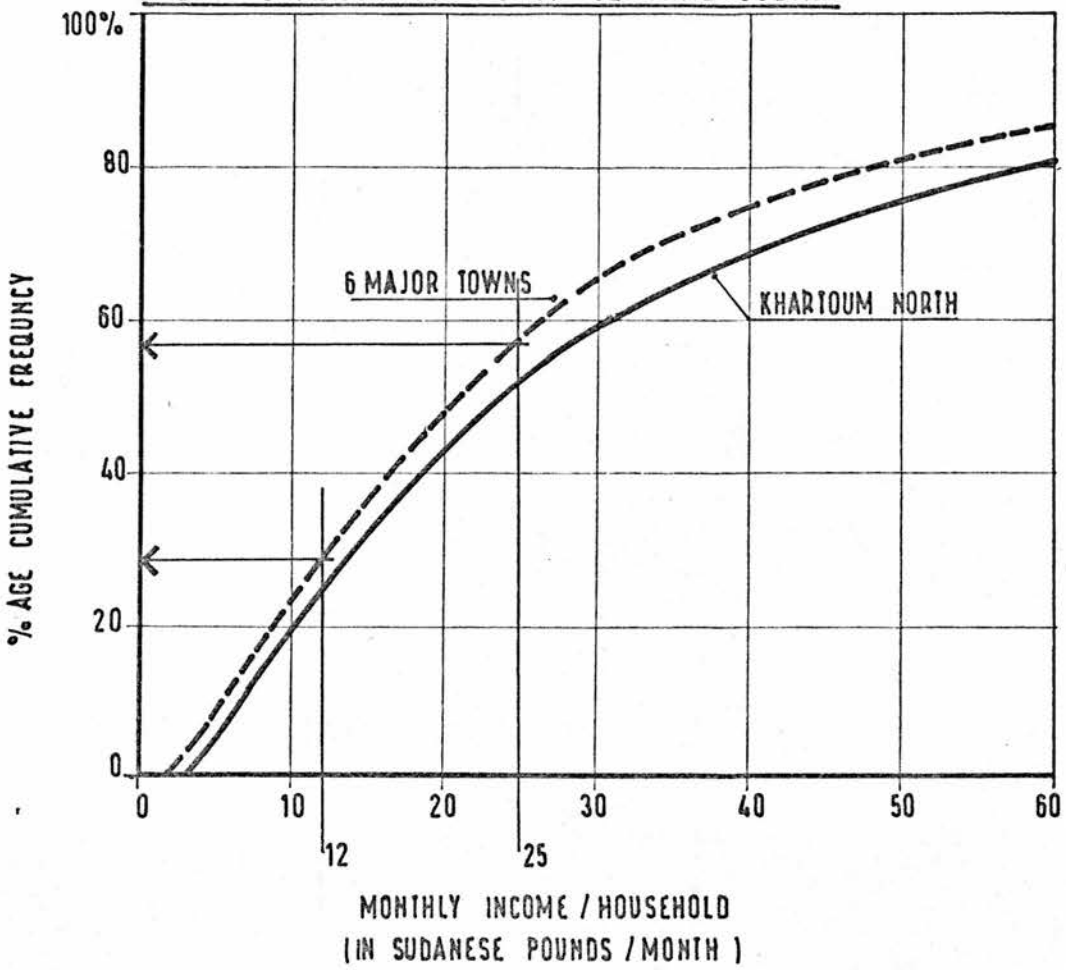
1. The evidence from this survey showed that that is seldom the case. Only less than 20% of heads of households in the sample said they received financial assistance from members of their households who were economically active, and even in such cases where such members contributed towards household expenditure, their contribution was only a fraction of their incomes.

2. Distinction must be drawn between an urban low-income family and a rural one.
See; SOLOW, A.A. "Housing in Latin America - The Problem of the Low-Income Families". Article in "Urban Planning", July, 1967, pp. 87 - 102.

figure 15:

DISTRIBUTION BY TOTAL INCOME OF HOUSEHOLDS IN KHARTOUM AND IN 6 MAJOR TOWNS OF CENTRAL SUDAN



Average working force/Household = 1.7 Persons in Khartoum North
& = 1.8 Persons in 6 Major towns

specified, then the question arises, what about those who have incomes below the minimum line?

It might be argued that minimum income limits are to be specified in order to ensure the re-payment of mortgages, etc., but here it is important to define clearly the role of the government and to distinguish between housing as just a form of economic investment or as part of a social programme directed to upgrade and control housing and general living standards. For the private developer who wants to ensure his revenue, there might be a point in the specification of minimum limits of income. For the government authority concerned with up-grading the living and housing conditions of the poor without much burden on available economic and financial resources, the specification of minimum limits of income may ensure the second objective but not the first. The adoption of modest standards might achieve part of both aims.

3.5 THE DEFINITION OF THE LOW-INCOME EARNER RELATED TO THE COST OF THE HOUSE IN THE PROJECT

The cost of house in the project varied from just under £S600 for house type (2) to just over £S850 for house type (1).[1] If on bases of the income qualifications the

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1. The cost of house was taken to include cost of land, essential charges and departmental fees, but to exclude any other expenditure on running the house, such as municipality rates, electricity and water supply. The figures given refer to the cost of house in 1962 (first phase). It must be added that for various reasons, the cost of house in 1967 (last phase) was much higher. The cost of house type (2), for example, was around £S800. Figures about costs of houses were obtained from A. HAMID, ibid.

figures £S15 and £S22 are taken as the average monthly salaries for heads of households in house type (2) and house type (1) respectively, the cost of the house for those in the sample will be equivalent to about 3½ man-working years in each case. In practice, the amount is paid by monthly instalments over an average period of 15 years at a fixed rate of not more than a quarter of the tenant's monthly salary at the time of application; later changes in salary are not considered.

Table 7 shows, for each house type, the average monthly expenditure on running the house. This accounts for about 40% of the average tenant's salary. In addition, most tenants said they spent between 10% and 20% of their monthly salary on other related items, such as maintenance of the house and transport to place of work.

TABLE 7

AVERAGE MONTHLY EXPENDITURE ON RUNNING THE HOUSE

Item	House type (1)[1] £S	House type (2)[2] £S
Rent (1/4 of Salary)	5.500	3.750
Municipality rates	1.200	0.800
Electricity	1.000	0.900
Water supply	0.450	0.450
Total	8.150	5.900
Percentage of tenant's salary	37%	40%

1. Average salary of head of household £S22 per month.
2. Average salary of head of household £S15 per month.

The majority of tenants, as already described, had monthly salaries above the specified range (12 - 25 Sudanese pounds per month) and they were able to allocate reasonable portions of their incomes towards running the house. About one-third however, had incomes within or below the range and were unable to allocate such portions for housing. Some of them had moved out and sublet their houses, while others took in lodgers.[1]

3.6 DISCUSSION

There are two points to emerge from the above description: The first is that the project provided good opportunities for house ownership, but the cost of house was high in relation to the income of the tenant described by the qualifying criteria. If the qualifying range of income was raised - to keep pace with the cost of house - this will simply mean building for a smaller group of the urban population who can afford to pay while a considerably larger proportion of the population will be put off from government housing. Already 50% of the economically active people in urban areas have incomes lower than the specified range and are therefore not qualified for a house in the hire-purchase schemes. The only other alternative therefore is in reduction of building costs. Experiments can be made

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1. One remarkable feature in the project was the great contrast in standards of living, levels of housekeeping and types of possessions among different households and particularly between the two house types. For example, 10% of households in house type (1) had cars and 7% had television sets; only 2% of those in house type (2) had such possessions. For further details see; Table 11b, Appendix 5.

with building materials and building methods and efforts can be directed to reduce labour costs (particularly as they account for about 40% of total cost); but while such experiments are badly needed and should be encouraged, they promise to solve only a minor part of the problem. It was stated in the Report of the Royal Commission to East Africa that:

> 'However much such measures may succeed in reducing costs, they will not solve the problem, because the disparity between building costs and the rent which the majority of those who need housing can afford to pay will remain too great.'[1]

There is therefore need for a more rigorous and fundamental approach. Traditionally, the Sudanese house was an infinite concept: it was a life-long endeavour which was progressively developed as needs changed and resources permitted. Few monetary resources were needed because the materials used in building were simple and the labour was provided by the man and his neighbours. Today - with changes in building industry and in standards of building - unskilled labourers, craftsmen, or in a few cases contractors are employed to assist the home owner. The latter through his organization ability and direct supervision is usually able to bring the cost of building to his savings.[2] He can

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1. REPORT OF THE ROYAL COMMISSION ON EAST AFRICA: 1953-55; Summary of section on Urbanization and Housing pp. 223-232. HMSO.

2. Similar observations were made by John Turner in Latin America; See; TURNER, J. "Dwelling Resources in South America" Architectural Design, August 1963, pp. 360-393 and "Barriers and Channels for Housing Development in Modernizing Countries". Journal of the American Institute of Planners, May 1967, pp. 167-181.

use second-hand doors and windows from his old house and can employ a friend brick-layer in an informal basis etc.

If the cost of house has to be brought to the means of low income earners, government projects should leave room for this sort of process. The government can, for example, provide well laid out plots of land with the minimum of services and community facilities (and probably the minimum of shelter) but otherwise leave room for the tenant's participation. Apart from making it possible to ensure a reasonable balance between tenant's income and cost of house this type of 'open ended' approach makes it more possible to encourage interest in home improvement and provides a good chance to come to terms with people's felt needs and order of priorities.[1] John Turner writes on this theme:

> 'The house must often be buildable in stages from a minimal nucleus in response to future needs and opportunities, and at the same time be able to accommodate changing ways of living as a family gradually discards the parent's rural background in favour of children's city-bred customs'.

He also advocates that maximum freedom should be provided for owner builder to use his own resources; by anticipating the sequence of building normally practiced by people and by respecting their order of priorities; 'of these the first is land and the security and social identity it provides. With the land come the basic utilities:

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1. Although people's needs and order of priorities must be respected, a certain degree of government control (and of course guidance) will be indispensable; see later.

drinking water, stand pipes and perhaps electricity, at a cost that need not hinder the building of minimal house'.[1]

The second point to emerge is that; as monthly rents have been fixed to the tenants initial income this seems to create a discrepancy between income and allocations for housing throughout the life-cycle of the family. In the period when the tenants income is relatively low (immediately after rehousing) a high proportion is allocated towards rent; as the tenant's income gradually increases, the proportion of income allocated towards rent gradually diminishes. To encourage a more balanced relationship between family income and family allocations to housing a point has been made above in favour of progressive development. However, where credit facilities are involved, it seems more reasonable to concentrate repayments at later stages than initially. This entails rises in instalments (or rents) with rises in income and perhaps an extension of the amortization period.[2]

3.7 SUMMARY

Not long after the allocation of houses, most tenants were found to have incomes higher than what had been defined

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1. TURNER, JOHN, "Dwelling Resources in South America", ibid.
2. A similar point was made by Foote, Abu Lughod, Winnick and others in relation to American Housing. They wrote: 'If younger families consume more housing than they can pay for currently, some closer adaptation of credit arrangement to future income prospects - concentrating the payment burden further on in the high income phase - seems a reasonable improvement over present credit terms'.
   See: FOOTE, N. AND OTHERS; "Housing Choices and Housing Constraints". New York, McGraw Hill, 1960; Preface.

(for the purpose of the project) as a 'low income earner'.[1] The main reason for this was that at the time of allocation of houses most tenants were young and had every opportunity for raising their incomes as they developed further urban experience and skill.

Although income levels in the sample were higher than expected, it was found that a large part of the average tenant's income was, in fact, taken up by mortgage and other expenditure on running the house. This was due in part to the relatively high cost of house and in part to the concentration of repayment over an average amortization period of 15 years. The tenant whose income was in the range (12-25) Sudanese pound per month paid about 40% of his income for mortgage and other expenditure on running the house. But as the tenant's income was rising, this proportion was gradually diminishing.

The project, no doubt, opens good opportunities for home ownership; to make these opportunities available for those most in need without undue burdens on their finances, the above analysis suggests that:

(1) In the selection of tenants consideration should be given not only to income levels at the time of application but also to future income prospects.

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1. The low income earner was defined as someone with monthly salary plus cost of living allowance in the range 12 to 25 Sudanese pounds per month. In urban areas of Central Sudan about three-quarters of the population gainfully employed had salaries within or below this range; See DEPARTMENT OF STATISTICS (KHARTOUM) "Population and Housing Surveys, 1964/65".

(2) The repayment of cost of house needs to be arranged so as to ensure a reasonable relation between family income and rent of house. This may imply concentration of repayments at later stages when family income is relatively high.

(3) At present, the cost of house is relatively high in relation to tenant income and this has resulted in considerable proportion of the family income to be allocated to expenditure on housing. There are various ways of rectifying this situation, varying from reduction of building costs to extension of the period of amortization; but most important of all there is need for a new outlook towards housing standards.[1]

1. This point is discussed in more detail in Volume I.

CHAPTER 4: RESPONSE TO THE HOUSES

4.1 INTRODUCTION

After living in the project for an average period of three years, most tenants seemed to have formed certain opinions about their houses. Quite a few of them had managed to make some alterations and additions to their houses and others only expressed a desire to do so. The present section describes the opinions expressed by the tenants about the houses, the types of alterations and additions they had made and the suggestions they put forward for further improvement of the houses. Particular emphasis is placed on the tenants' responses with respect to the size, subdivision and layout of space in the house.

4.2 OPINIONS ABOUT THE HOUSE

Although certain features of the design had been selected for detailed appraisal, the opinions expressed by tenants tended to reflect a general attitude towards the whole project with all its planning, economic, financial and general administrative aspects. For example, many tenants, when asked their opinions about the size of the plot, added other remarks about the rest of the house and the responsibility for maintenance, etc. It was also noticed that many of those dissatisfied with one aspect of the design were also dissatisfied with other aspects.

Having made these reservations, it can be said that the opinions expressed by male heads of households about the

size of house reflect a general level of discontent. About two-thirds (67%) said the rooms in the house were too few, and about 60% said the size of the plot was too small. The layout of rooms in the plot met with more approval, but various comments were added, mostly concerning the need for more privacy for womenfolk when there were male visitors in the house.

Heads of households in house type (1) were generally more satisfied with their houses than those in house type (2). For example, 45% of heads of households in house type (1) were satisfied with the number of rooms in their houses, compared with only 23% of those in house type (2). This, however, was not unexpected as house type (1) had more rooms and more plot area than house type (2).

The response to the houses was generally more favourable amongst housewives. For example, in comparison to the figures given above, 80% of housewives in house type (1) and 55% of those in house type (2) were satisfied with the number of rooms in their houses.

(i) THE SIZE OF THE PLOT

Only 45% of tenants in house type (1) and 36% of those in house type (2) were satisfied with the size of their plots. Almost all the others thought their plots "small" or "very small".[1] Seven families considered their plots "big" but four of these families contained less than 5 persons.

The reasons given by the informants for dissatisfaction

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1. Appendix 5, Table 14a.

with the size of plot mainly centred on family size. Almost three-quarters (73%) of tenants who thought their plots "small" or "very small" referred to the large size of their families and the insufficient space within the plot for family living. A few mentioned the extra pressure on space due to having more than one family in the house.

The reasons stated came as no surprise: houses had been allocated to individual young families, each of a minimum size of five persons. As most families were young, more children were born after rehousing. Also, as shown earlier, about half the families in the sample had taken in lodgers and other related family units. The individual household was therefore rapidly expanding and the rate of plot space available for the individual or groups of individuals in the household was consequently decreasing. Figure 16 clearly shows the relationship between rate of plot space per person and tenant satisfaction: at plot space below 60 square metres per person the correlation between satisfaction and rate of plot space becomes very pronounced.[1]

(ii) THE NUMBER OF ROOMS

The response to the number of rooms in the house was even less favourable than that to the size of the plot. House type (1), with three main rooms and a verandah, was

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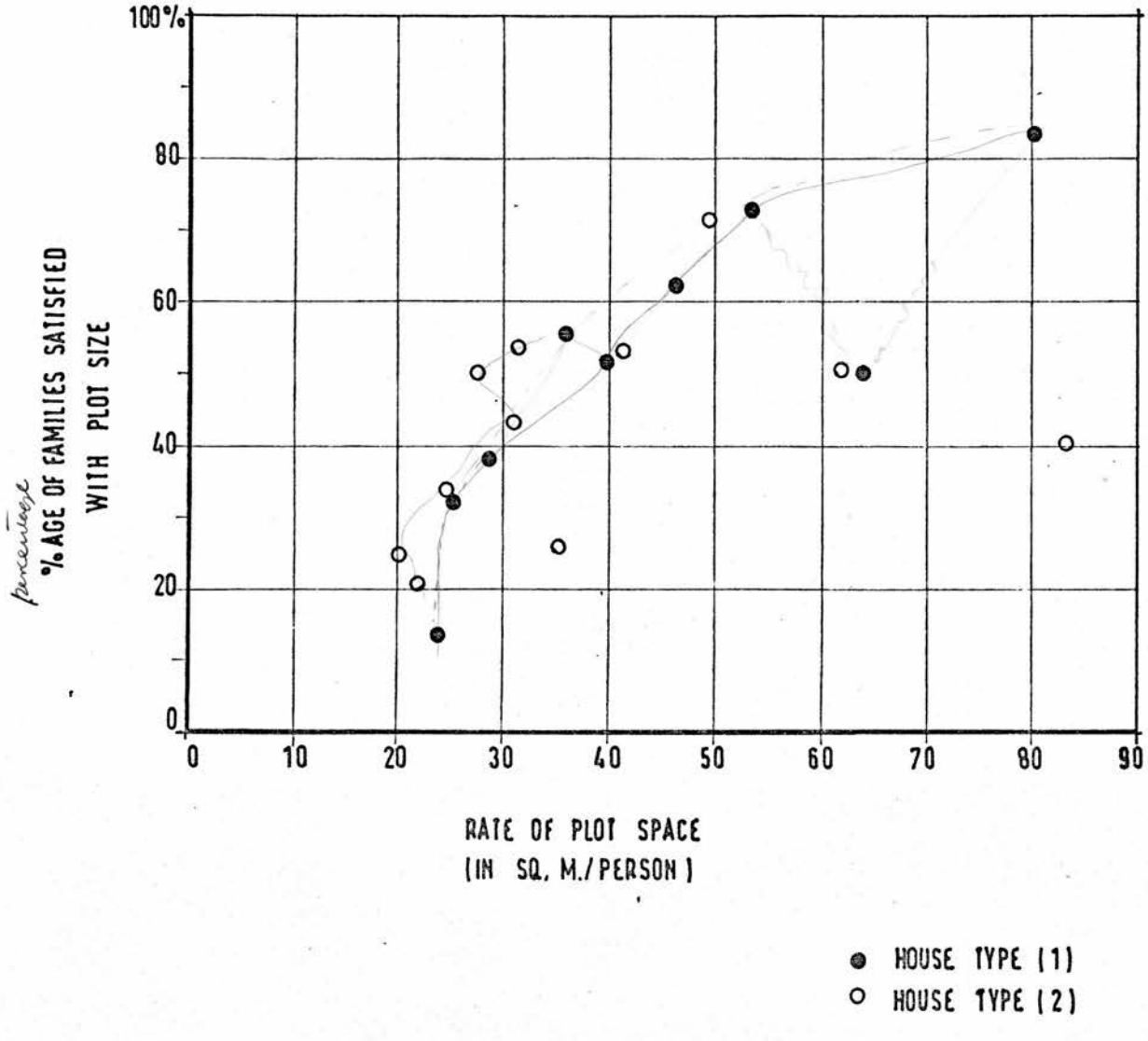
1. The opinions expressed about the size of the plot were further analysed against other family characteristics (e.g. family income, education and age of head of household). None of these variables was found to have a significant degree of correlation with the opinions expressed about the house.

figure 16:

PERCENTAGE OF FAMILIES SATISIFIED WITH THE SIZE OF THE PLOT ACCORDING TO DIFFERENT RATES OF PLOT SPACE



found satisfactory by less than half of the tenants (45%), while house type (2), with two main rooms, was found satisfactory by less than one-quarter of the tenants (23%).

As in the case of plot size, the reasons given for dissatisfaction were mostly connected with size of family. About 85% of the tenants dissatisfied remarked that the rooms were too few to cater for "their large families". Figure 17 shows, for each house type separately, the percentage of tenants satisfied with the number of rooms against the number of persons in the house.

The opinions expressed about the number of rooms in the house were further analysed in relation to the age and sex ratio in the household (figures 18 and 19). Although the results seem to be less consistent than for example in the case of family size, the figures, nevertheless, point to a trend among families with more complex structures to be less satisfied with the number of rooms in their houses.

(iii) THE LAYOUT OF ROOMS IN THE HOUSE

Although tenants were reasonably satisfied with the layout of rooms, three complaints were often heard. The first concerned the position of the external door in relation to the women's rooms. Over 60% of the residents remarked upon the fact that the main entrance faced onto the windows of the women's rooms and allowed no privacy for their womenfolk when male visitors entered the house.[1] Some women also added that they had difficulty entering and leaving the

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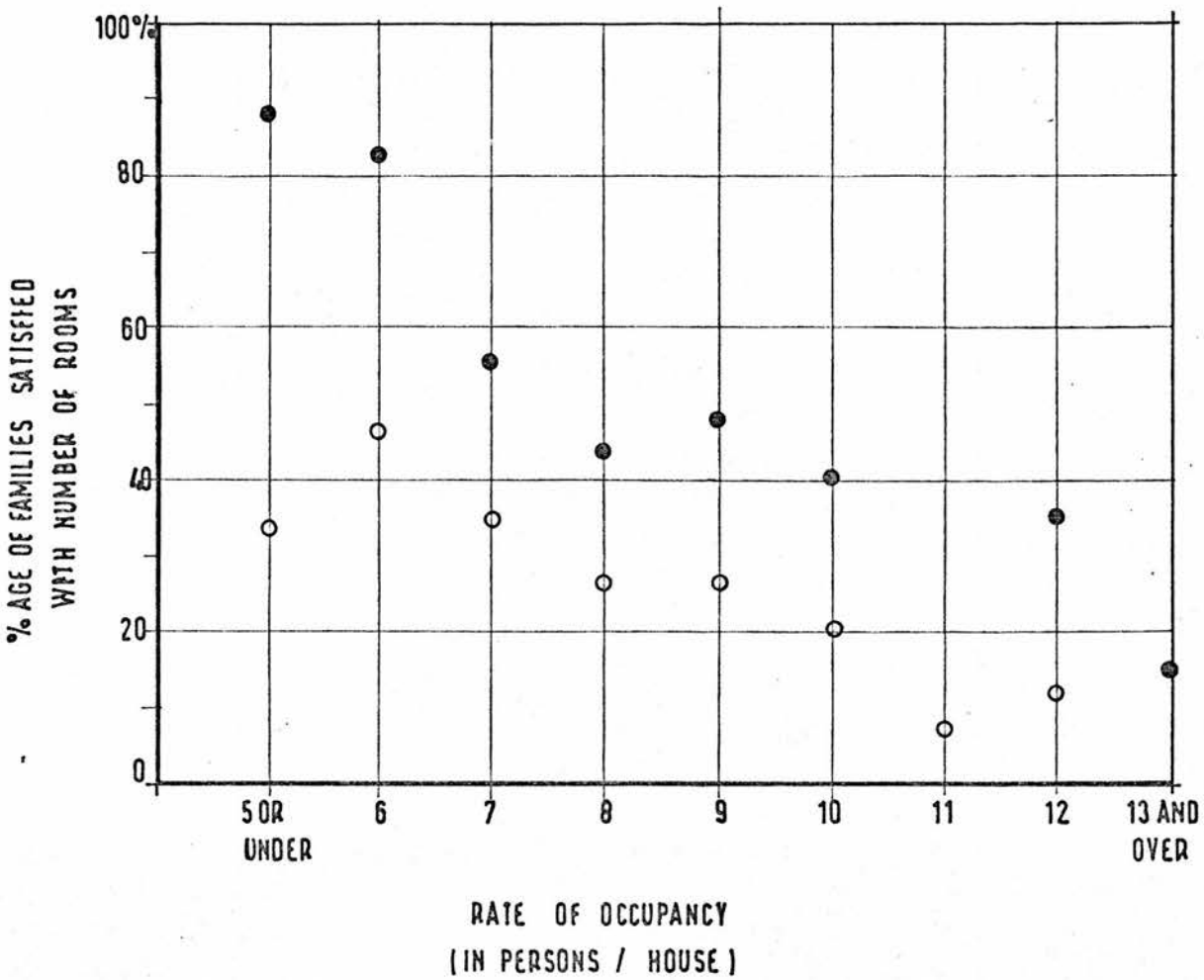
1. Some tenants had solved this difficulty by building a dividing wall (see later).

figure 17 :

PERCENTAGE OF FAMILIES SATISFIED WITH NUMBER OF ROOMS ACCORDING TO DIFFERENT RATES OF OCCUPANCY



SATISFACTION OF FAMILIES WITH NUMBER OF ROOMS IN THE HOUSE ACCORDING TO AGE AND SEX COMPOSITION

figure 18 : HOUSE TYPE (1)

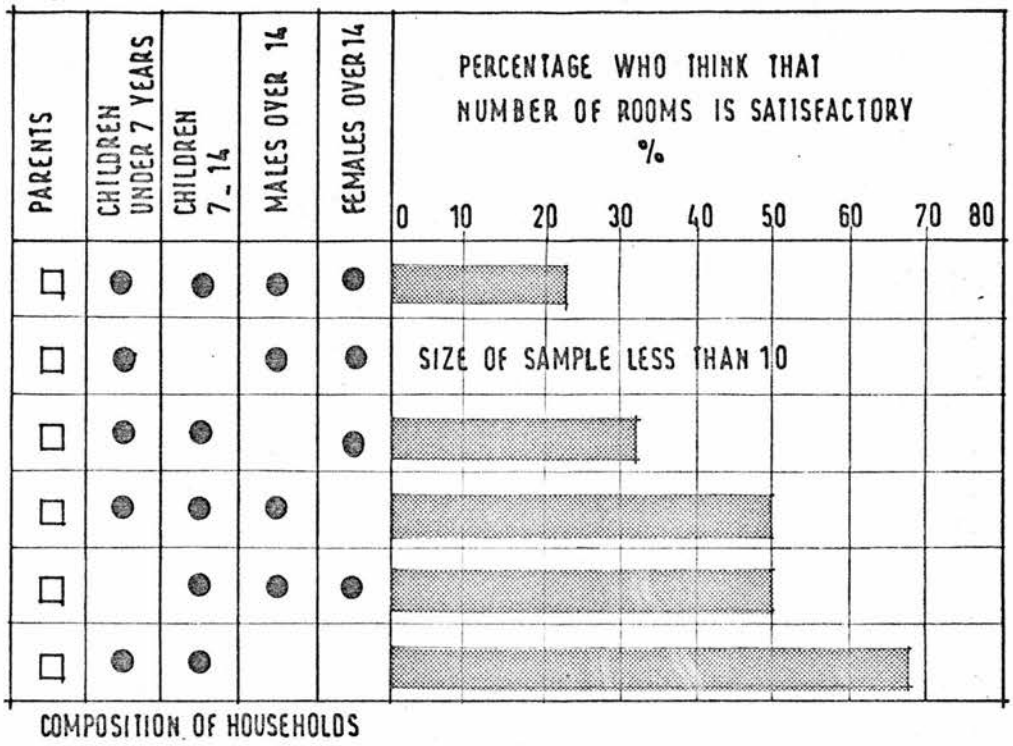
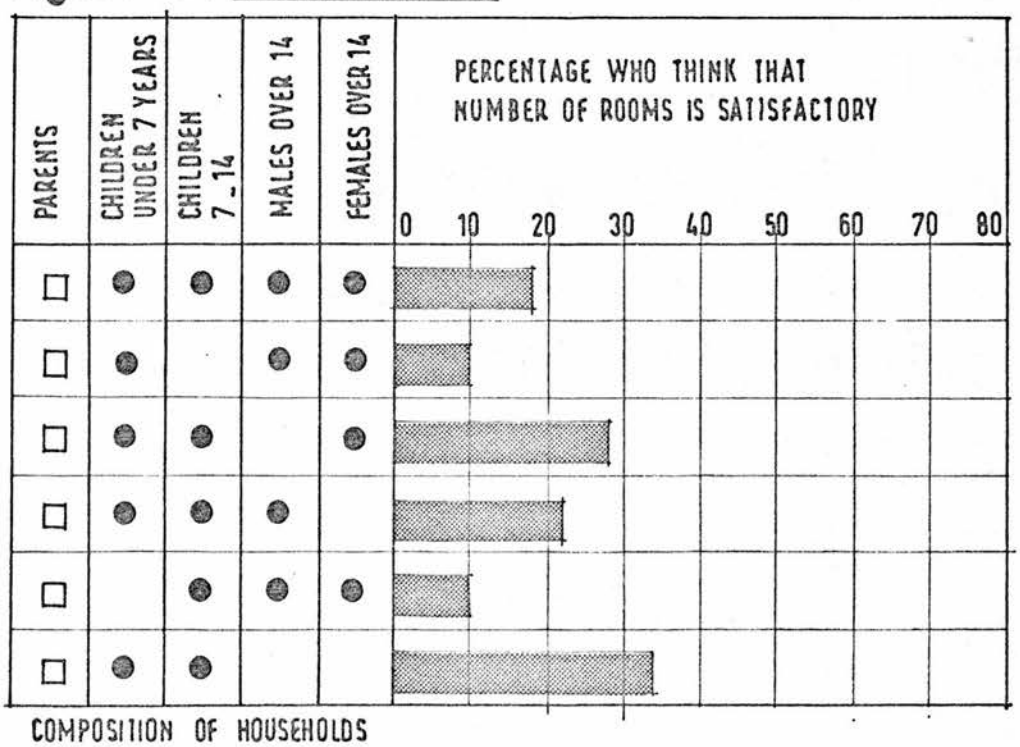


figure 19 : HOUSE TYPE (2)



NOTE: Only most frequent types of households are chosen for the analysis

house when there were male visitors as the only entrance is exposed to the men's compound.[1] A similar difficulty was experienced in the use of the W.C.; 80% of housewives found its position inconvenient.[2]

The second complaint concerned the height of the external walls of the compound. About 45% of the tenants found the boundary walls of the compound too low to provide sufficient visual privacy from neighbours and passers-by. It was noticed that some of the tenants had already increased the height of their boundary walls.

The third complaint concerned the need to provide more privacy between members of the household belonging to different age and sex groups. Slightly less than one-third of the tenants said that the arrangement of the open spaces within the compound did not provide for sufficient privacy between sexes in outdoor sleeping. Although the plot was arranged such as to provide two separate compounds, one for males and one for females, many tenants spoke of conflicts arising particularly when they had guests to stay overnight.[3]

(iv) OTHER ASPECTS OF THE DESIGN

Apart from opinions expressed about the size of the plot and the number and layout of rooms in the house, various comments were made on such aspects as sizes of individual rooms, materials and method of construction and absence of

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1. About 17% of the tenants suggested another external door (see Table 17, Appendix 5).
2. Appendix 5, Table 15b.
3. Appendix 5, Table 15a.

certain facilities. As these items were closely related to tenants' suggestions for improvement of the houses, the two are considered together.

While more than 80% of the tenants were satisfied with the sizes of secondary rooms (e.g. kitchens, verandahs, bathrooms and W.C.'s), only 45% were satisfied with the sizes of the main rooms; this was due to two main reasons: First, most families kept one of the main rooms for guests and lived mostly in the other room(s). This resulted in excessive pressure on these room(s), particularly during the day when it is usually hot outside. Second, none of the two house types had provided a store for household equipment and the main rooms were simultaneously used for living and for storage of household possessions. This resulted in conditions of overcrowding in the main rooms and reduced considerably the area that could be effectively used for family living.[1]

Various complaints were also raised concerning the absence of certain facilities in the houses; figures 20 and 21 summarise the suggestions made by tenants for additional features. It will be noted that an extra room was rated first in the list of priorities by tenants of both house types. Both husbands and wives in house type (2) placed an additional verandah next in importance despite the fact that most had added one or two verandahs after moving into

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1. See later, Chapter 5: USE OF ROOMS...

SUGGESTIONS MADE FOR ADDITIONAL FEATURES :

figure 20: HOUSE TYPE (1)

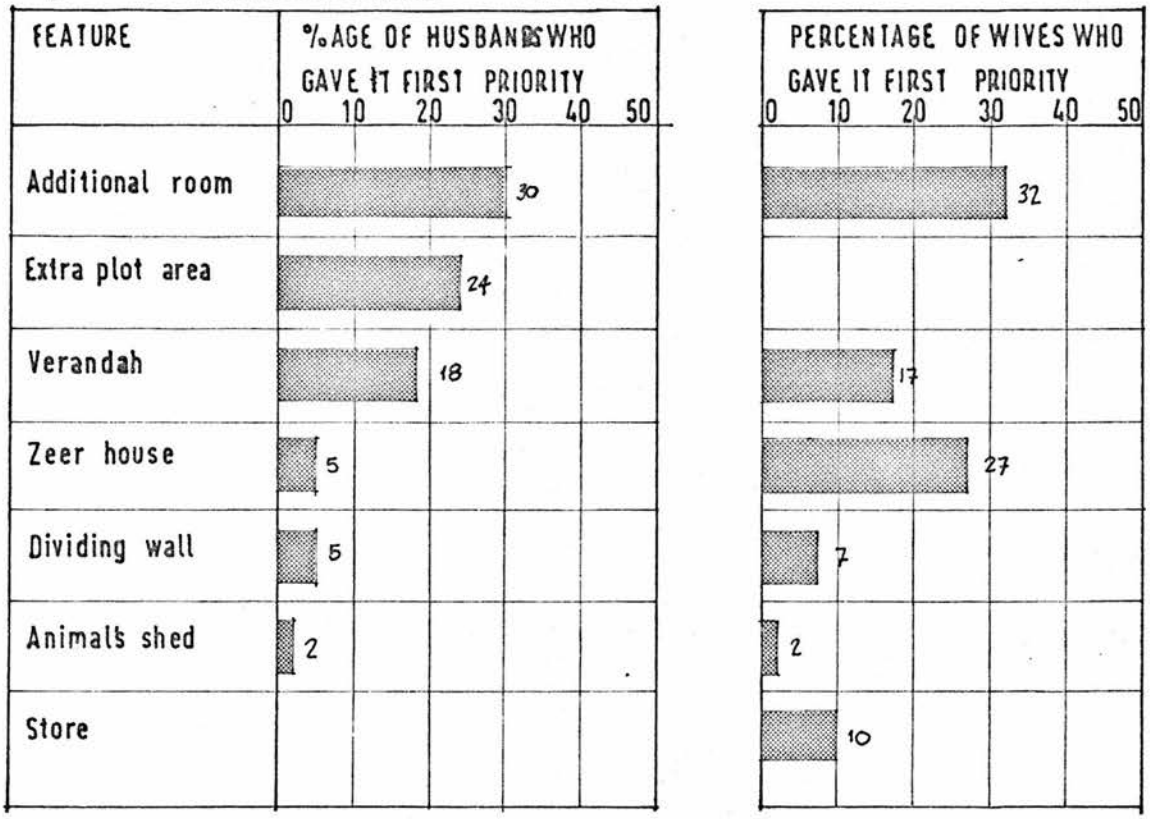

figure 21: HOUSE TYPE (2)

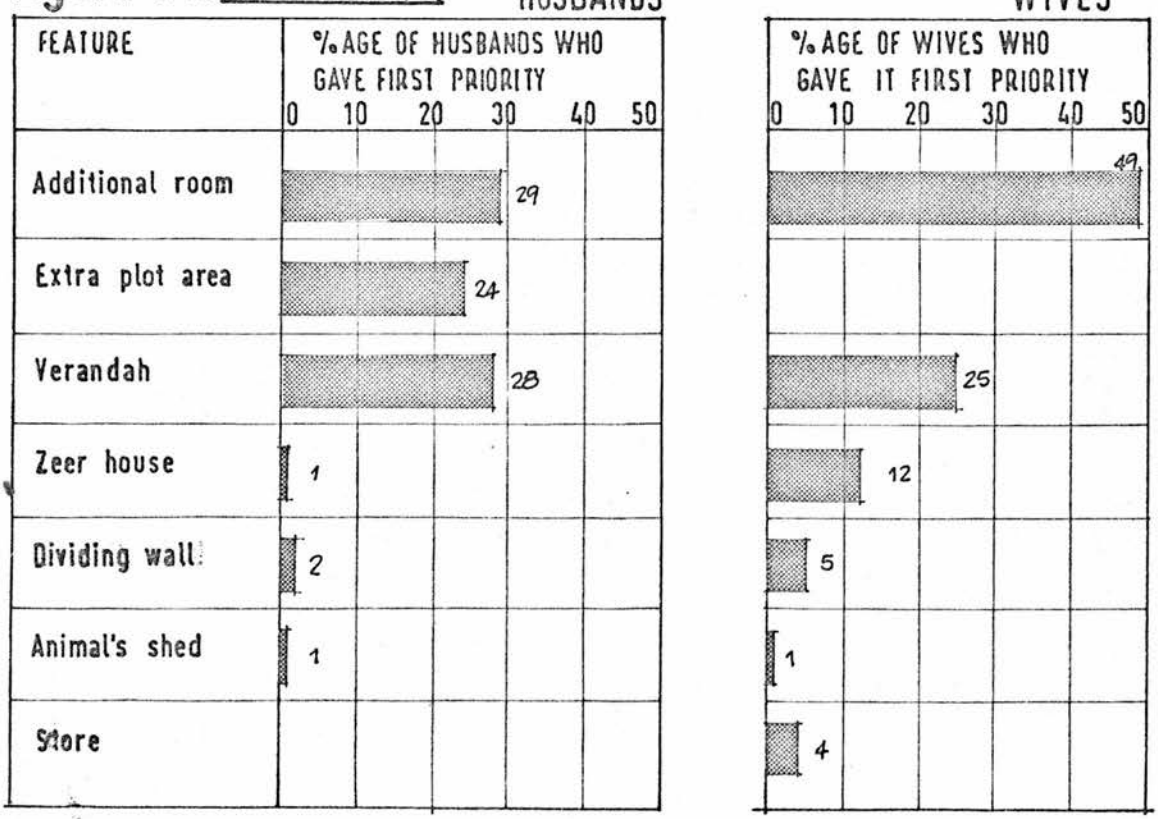

PLATE 7.
The original external door.

PLATE 8.
An example of a door fixed to replace the original one.

PLATE 9.
Another example of new external door.

PLATE 10.
Complete change of the external appearance of the house.

the house.[1]

Further suggestions were also made by heads of households for general improvement of the house and by housewives for improvement of the kitchen. Details of these are given in Tables 17 and 18, Appendix 5.

Although it was explained to tenants that some of these additions and improvements would involve quite a lot of extra expense, most of them appeared willing to improve their houses when their financial circumstances permitted, in fact, some of them had made some alterations and additions to their houses.

4.3 TYPES OF ALTERATIONS AND ADDITIONS MADE TO THE HOUSES

The most notable alteration made is to the external entrance of the house. In almost one in ten cases the original external door (Plate 7) has been removed and replaced by a wider and more sophisticated one (Plates 8 and 9). This seemingly unimportant observation underlines one of the most important factors which affects the degree of importance that occupants put on different design features, the order in which they like to alter or add such features, and the amount of money they will be ready to spend on them. The external entrance is considered by occupants as one of the ways to impress visitors and passers-by, and as such, it becomes a symbol of status and prestige. Consequently, a

1. Obviously the opinions expressed about additional features relate to the type of additions which had already been made. The relatively higher demand for an additional room can be partly explained by the fact that only 8% had added a room while more than 50% had already added one or two verandahs.

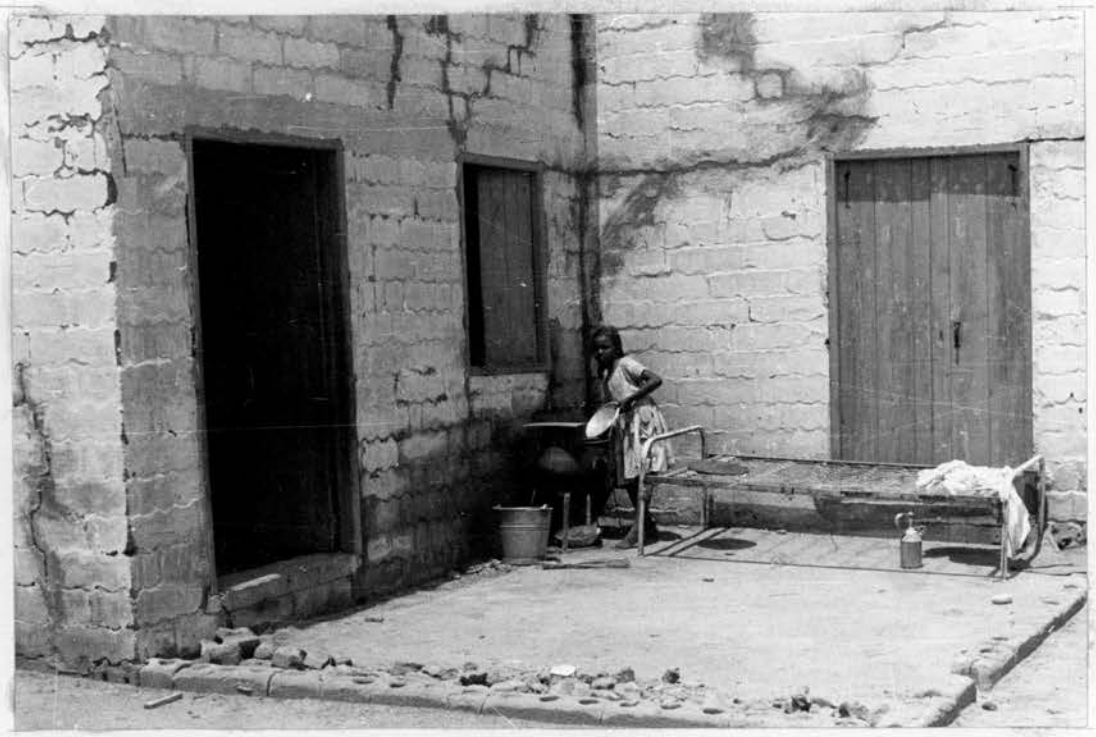

PLATE 11.
The women's room before the construction of the verandah: Notice the position of zeers (drinking water jars).

PLATE 12.
An example of women's verandah added: In front of the verandah is a traditional bed (angarib).

number of occupants are willing to spend money in fixing, painting and decorating a new 'high standard' external door; a similar attitude also seems to apply to the furnishing, and use of different rooms in the house; See Chapter 5.

Another expression of this attitude could be seen in the finish of the external boundary walls of the house. In over 30% of houses in the sample the external walls have been cement-rendered or rough-casted and painted. In some cases, this has completely changed the external appearance of the house (Plate 10).

Most of such alterations took place in house type (1) where the relatively high incomes and the corresponding higher standards of living made them possible.[1]

Inside the house, numerous additions have been made. The most common additions include:

Women's verandah[2]

Men's verandah

Kitchen verandah

Zeer-house[3]

Animal shed

Dividing wall between men's and women's courtyards.

(i) THE WOMEN'S VERANDAH

Women's verandahs have been added to 57% of type (2) houses. Of these, about two-thirds had already added men's verandahs. Plate 11 shows an example of the women's room before the verandah was added. The place suggested for the

1. Appendix 5; Tables 13a, 13b and 13c.
2. House type (1) originally included a verandah for women, while house type (2) did not.
3. The zeer is the clay pot for keeping drinking water.

PLATE 13.
An example of men's verandah added.

PLATE 14.
A door fixed to separate the men's verandah from the women's verandah.

verandah is marked on the ground (by building to plinth level). Plate 12 shows an example of a women's verandah added.

(ii) THE MEN'S VERANDAH

Neither of the original house plans included a verandah for men. This verandah was only suggested by the original plans to be added by the occupants and its position was marked on the ground in front of room (1) (i.e. the guest room). In the sample, 43% of type (1) houses and 46% of type (2) houses have men's verandahs now added to them. Plate 13 shows an example of men's verandahs. In some cases a door has been fixed to the small corridor between men's and women's vernadahs to ensure privacy for womenfolk against male visitors (Plate 14).

(iii) THE KITCHEN VERANDAH

A kitchen verandah had been added to 23% of house type (1) and to 51% of house type (2). The large number of kitchen verandahs added to house type (2) is due to the fact that in most cases the kitchen was used as a third bedroom. The verandah was therefore added in front of it to accommodate its functions.

(iv) THE ZEER-HOUSE

35% of house type (1) and 45% of house type (2) have zeer-houses usually added at the side of the bathroom (room 5) for ease of connection to the water supply (Plate 15). In cases where a zeer-house has not been built, the drinking-water

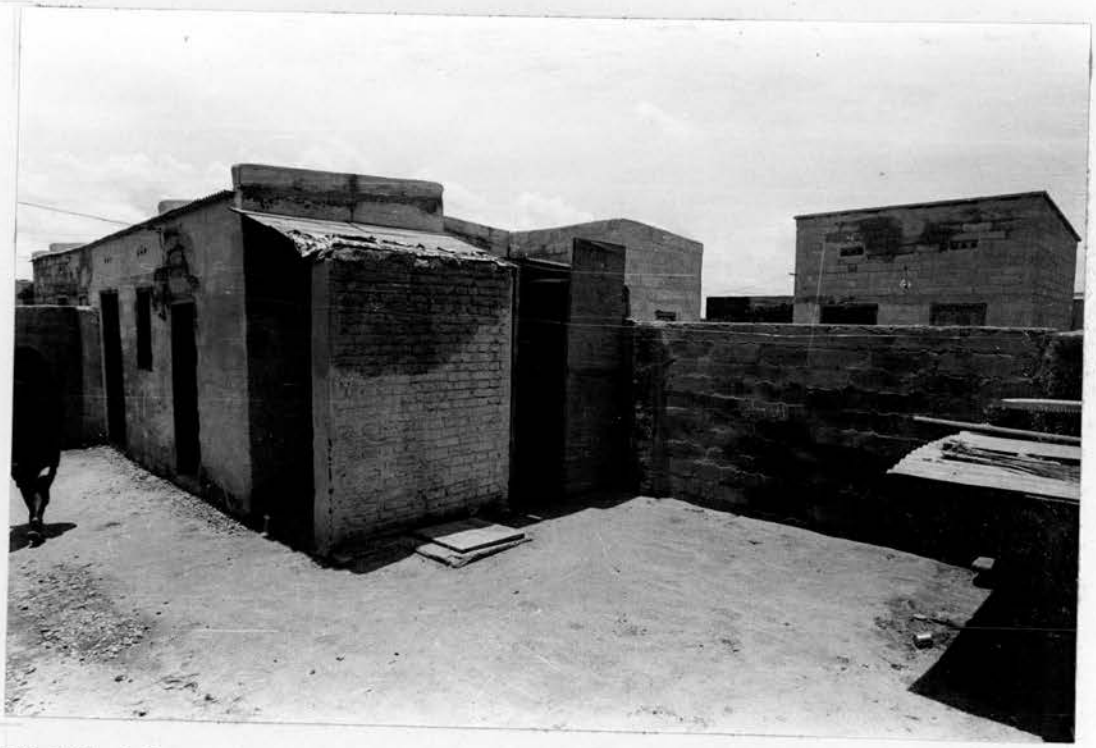

PLATE 15.
A zeer-house built at the side of the bathroom.

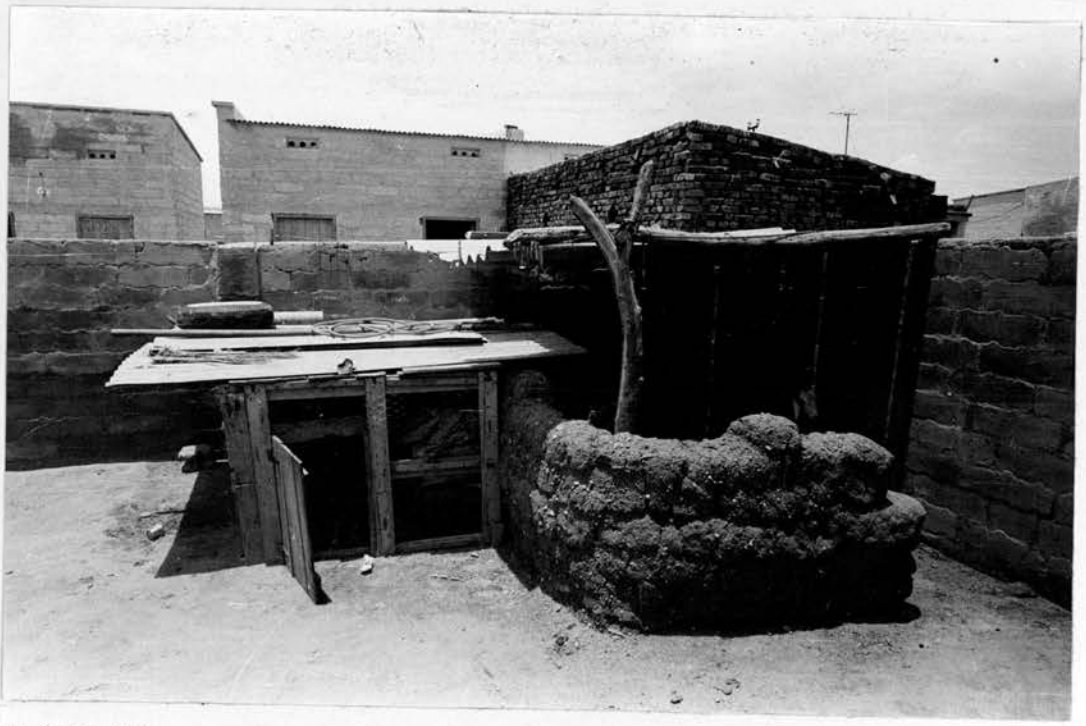

PLATE 16.
Examples of shed added for hens and goats.

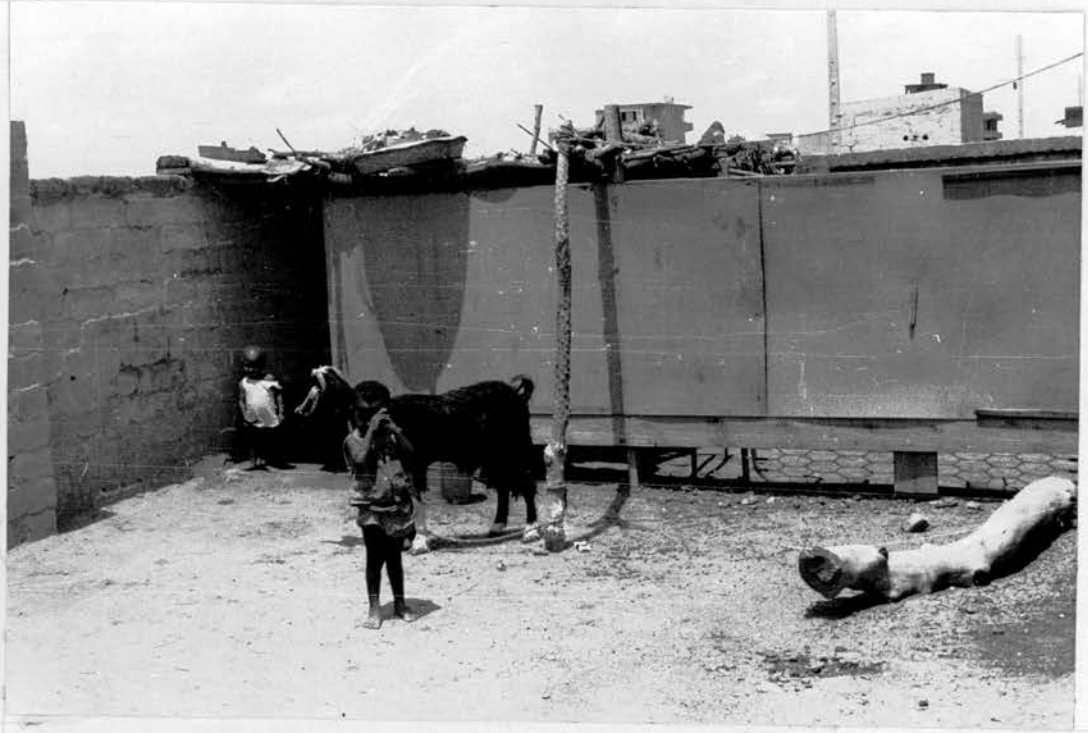

PLATE 17.
A screen of hardboard added to separate the men's yard from the women's yard.

PLATE 18.
Main water tap fixed to the external walls: Notice cracks in walls.

pots (zeers) are kept in the verandahs (or in the places suggested for verandahs), sometimes adjacent to the main room walls. In most of these cases, the room walls are damp and cracked (Plate 11).

(v) THE ANIMAL SHED

37% of families in house type (1) and 49% of families in house type (2) keep goats for milking. The majority of these had added an animal shed. In a few cases no animal shed has been added, and goats are left to move around the compound and the street, making both dirty and unhygienic. Plate 16 shows an example of hen and goat sheds added at one corner of the compound.

(vi) THE DIVIDING WALL

Dividing walls have been built in 10% of type (1) houses and 15% of type (2) houses in order to separate the women's compound from the men's. In most cases, dividing walls are built of bricks and other permanent materials, but in some cases hedges and hardboard screens are used to provide visual separation (Plate 17).

(vii) OTHER ADDITIONS

Various other additions have been made to the original plan types. About half the tenants in house type (1) have substituted the original rammed earth floors of the main rooms and verandahs with tiles, bricks and cement floors. Shading trees and lawns were observed in only about 10% of the houses, but these were in fact forbidden due to the

PLATE 19.
Example of garden in front of guest's room.

PLATE 20.
Another example.

expansive nature of the clay soil[1] (see Plates 18, 19 and 20). 17% of families have oil-painted the main room walls; 8% have fixed a false ceiling to increase heat insulation in the main rooms.

All such additions and alterations were made by the occupants themselves out of their own money. They were carried out at different times at varying costs and varying standards of construction and material. The original house plans had only left aside certain spaces on which some of these extensions could be made when the need arose.

Although a certain degree of guidance and inspection was given by the government,[2] it seems that further guidance (or perhaps a form of control) will be necessary without at the same time denying occupants personal expression and freedom of choice. In many cases extensions have been made without sufficient consideration of the internal and external layout of the houses leading to varied incoherence, wastage of space and so on. Figure 22 shows a typical plan of house type (1) after extensions have been made. It will be seen from the figure that the women's yard (9) has become too cramped and narrow to be used for out-door functions (such as sleeping). The use of this yard is also made difficult by its proximity to the animal shed. The latter was normally observed to be dirty, unhygienic and visually unpleasant. Since a major part of the family living is performed in the

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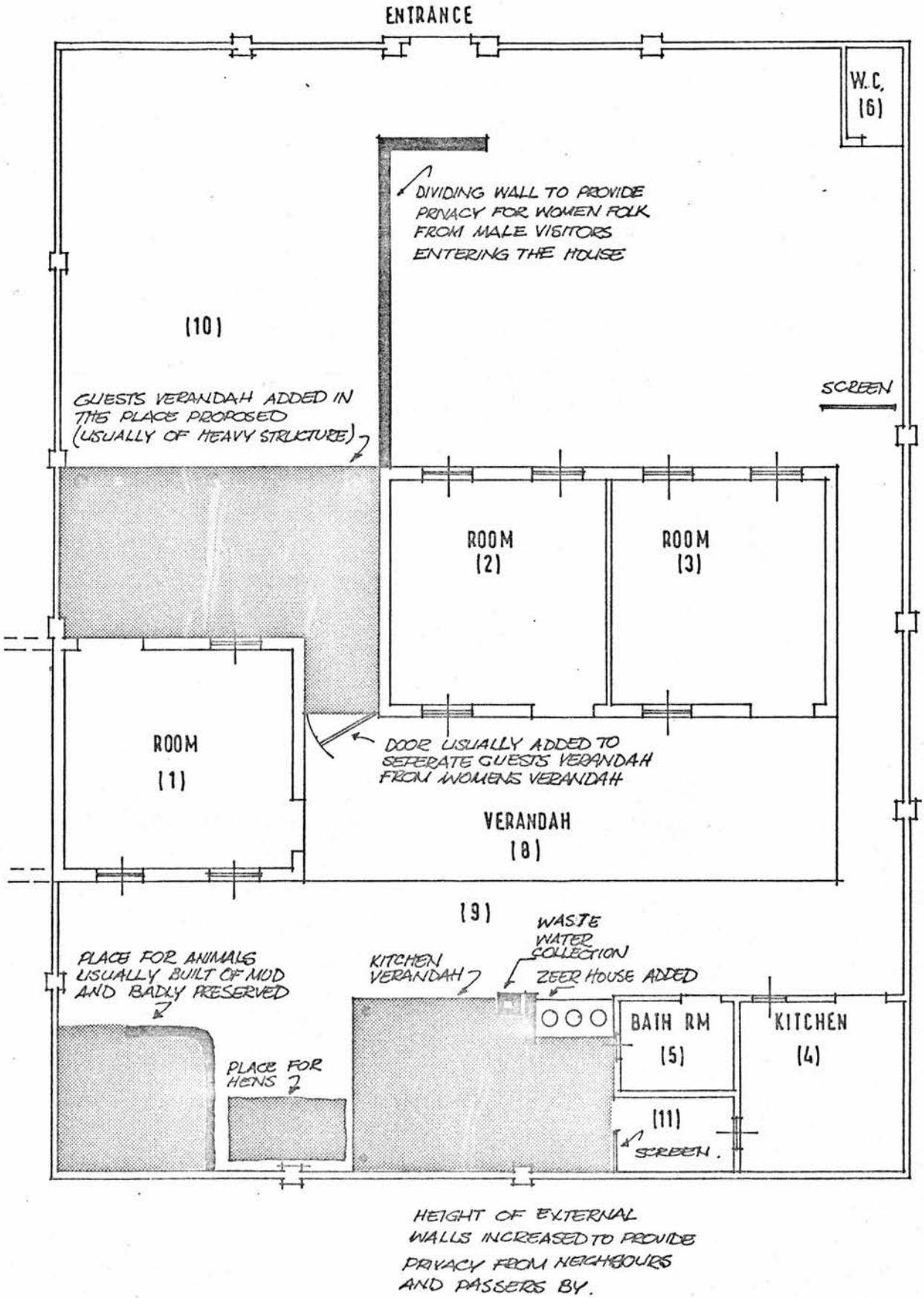
1. See, HAMID A, "A Case Study of Khartoum North Low-Cost Housing", ibid., p. 15.
2. Model houses were constructed to show people ways in which their houses could be further extended.

figure 22:

A TYPICAL PLAN OF HOUSE TYPE (1) AFTER THE EXTENSIONS HAVE BEEN MADE



women's part of the house,[1] the need for space in this quarter is relatively high. At the same time, the large area behind the women's rooms was hardly used at all due to lack of direct access from these rooms and its close proximity to the men's compound. This uneconomic use of space must have contributed a lot to tenant's dissatisfaction with the size of the plot.

4.4 SUMMARY

As the average household had grown larger and more complex, there has been a growing discontent with the size and layout of the plot. Over half the tenants found their plot sizes and number of rooms inadequate, and nearly one-third found the layout allowed insufficient privacy between the sexes. Although tenants' opinions about the size and layout of the house seemed, in some cases, to reflect a general attitude to the whole project, most tenants did, in fact, give reasons, mostly related to size of family. Further analysis showed, in fact, a significant degree of correlation between size of family and opinions expressed about the house.

Various suggestions were made by tenants for improving the house. The most important concerned the need to provide an extra room and a verandah, particularly in house type (2). A number of tenants had already carried out such additions to their houses. Verandahs were the most frequent additions made. Other less frequent additions included zeer-houses,

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1. See later, Chapter 5: USE OF SPACE...

animal sheds and dividing walls between men's and women's compounds. The evidence suggests that:

- there is an increasing interest among families for improvement and adaption of their houses to suit their changing needs;
- more room needs to be left for the development of this interest and for the direct contribution of families towards improving their homes;
- more guidance, and perhaps more government control, will be essential to ensure greater economy in the use of space (and money), more variety in the types of space produced, and better use of available space;

and - this form of guidance will need to be given without denying the occupants the freedom of choice.

CHAPTER 5: USE OF SPACE IN THE HOME

5.1 INTRODUCTION

The opinions and comments of the people interviewed in the surveys indicate that two interrelated criteria are used in judging the plan of a house. The first is the relation between size of house and size of household; the second is whether the space in the house is suitably divided to cater for various household functions and social values.[1]

The relation between size of house and size of household has been considered in the previous section. This section is mainly concerned with the second criterion - the subdivision of space in the home in relation to household functions and values. After discussing the Sudanese concept of the space in the home, the section continues, describing the uses made of the different types of spaces in the house types, pointing to the influence of various socio-cultural and climatic factors.

5.2 THE SPACE IN THE HOME

It will be necessary to think of the space in the home not only as that area within the external boundary walls of the individual house, but also all the area within the immediate surroundings of the house. For various climatic and social reasons, the space around the home is considered

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1. For convenience, the two criteria are treated separately, but in practice, they are closely associated. For example, a disproportionate subdivision of the living space among different sub-groups in the household can give rise to the feeling that the size of the house is inadequate for the size of the household.

part of the occupants' territory or haram,[1] and is consequently used for purposes that in other societies are usually performed indoors. The private open space within the compound is used for such functions as cooking, eating, sleeping, playing, washing dishes and washing clothes. The street and the public open space are used for the entertainment of guests, children playing and the celebration of big family occasions, such as weddings. It is necessary, therefore, to distinguish between five types of spaces available in and around the home for the performance of household activities; these are:

1. The room;
2. The verandah;
3. The private open space within the compound;
4. The street; and,
5. The adjacent public open space.

5.3 THE ROOM[2]

The names given to different rooms in the house were found inconvenient for describing their functions. To avoid misconceptions therefore, numbers will be employed to describe rooms instead of names. The key plans (figures 23a and 23b) show the identification numbers of different rooms

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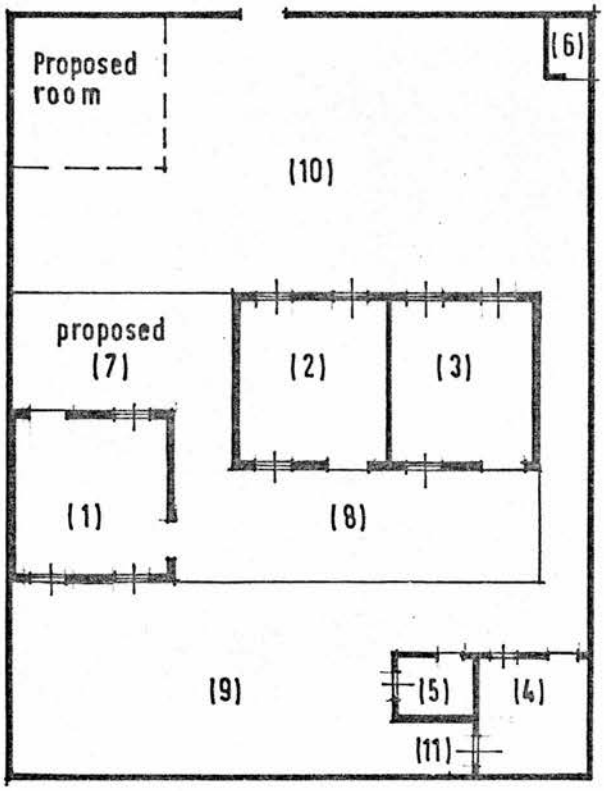
1. The area of one's own territory.
2. In this discussion, only habitable rooms are considered. A habitable room is defined for this purpose as a room which is used (normally or occasionally) for living or sleeping in. This includes guest rooms and family bedrooms and excludes bathrooms and W.C.'s. The kitchen is considered here as a habitable room because in many cases it was observed to be used as a bedroom.

KEY PLANS

figure 23 :

(a)

HOUSE TYPE (1)



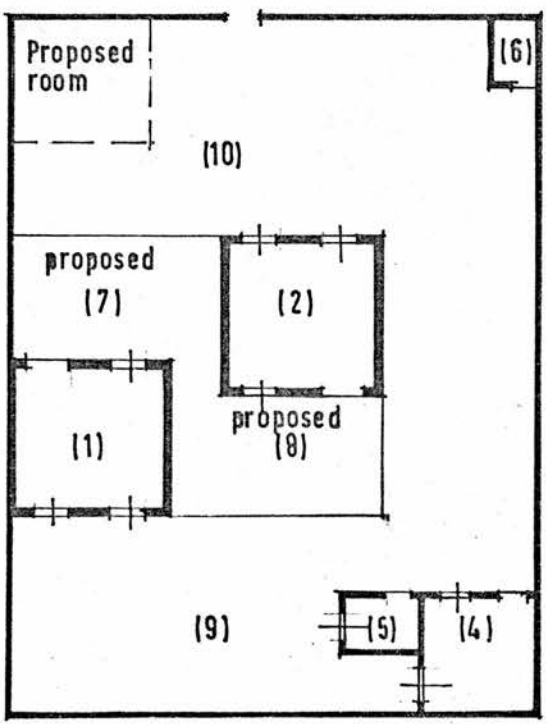
PURPOSE OF ROOMS ACCORDING TO DESIGN DRAWINGS:-

(1) Room
(2) Room
(3) Room
(4) Kitchen
(5) Bath room
(6) W.C.
(7) Verandah
(8) Verandah
(9) —
(10) —
(11) —

(b)

HOUSE TYPE (2)

SCALE 1: 200



and spaces in each of the two house types in the sample.

(i) GENERAL USE OF ROOMS

The use of habitable rooms in the average house depends first on the time of day (and the corresponding weather conditions), and second on whether there are verandahs or not. In general, habitable rooms are used for the storage of household furniture and other possessions; their use for household activities is restricted to the few hours at mid-day when the hot weather makes it impossible to perform these activities in the open. Even in such cases, their use for household activities is considerably reduced where a verandah has been added. Habitable rooms are also occasionally used when there are rain or dust storms or for occasional privacy such as is required when changing clothes. During the two or three cold winter months, rooms are intensively used for sleeping in and for various household functions in the mornings and evenings.

(ii) ATTITUDES TO DIFFERENT ROOMS

There is, however, a considerable lack of balance in the use of habitable rooms in the house. The majority of families in the sample prefer to keep room (1) mainly for the reception or occasional accommodation of guests for one or two nights. For this reason, it was usually well furnished, decorated, cleaned and left closed till a guest eventually arrives. At the same time, the whole family of eight or nine people performs most of its daily functions of living in the rest of the rooms or in verandahs where the

PLATE 21.
Interior of the family room.

PLATE 22.
Interior of the guest's room.

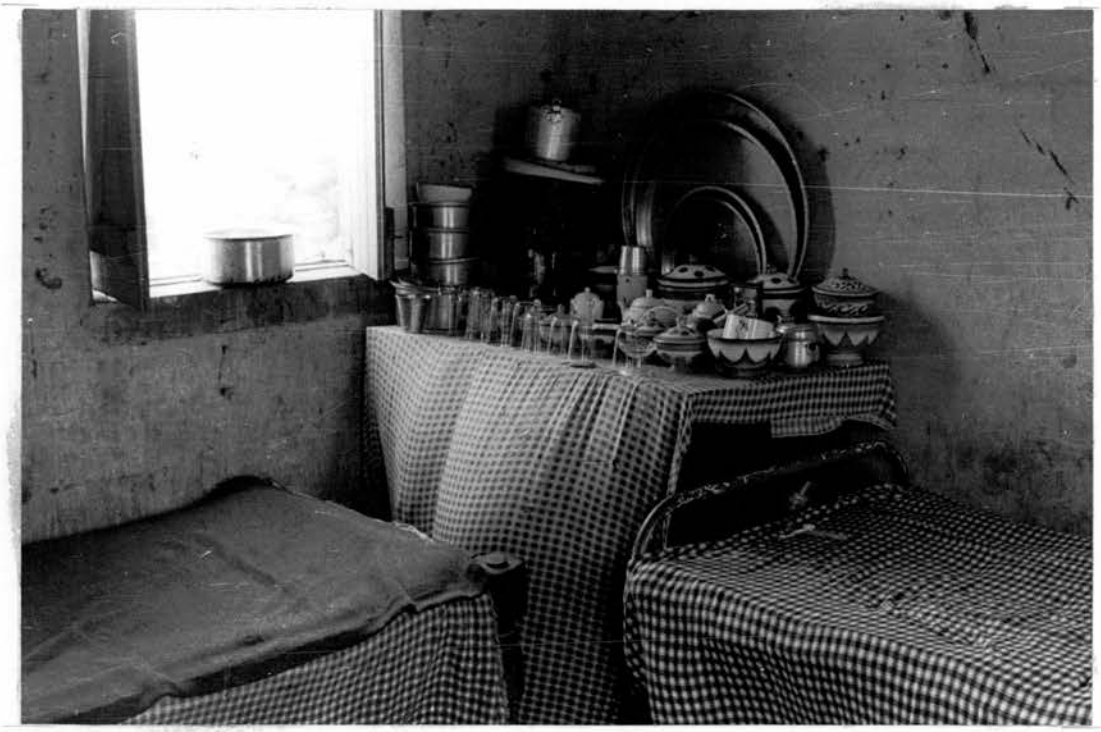


PLATE 23.
Example of kitchen utensils (displayed) in the family room.

PLATE 24.
Another example.

latter have been added. Most families seem to have found in this arrangement an opportunity for displaying their respectability and social status to their guests. Even in the many cases where the house contained only two rooms, one of the rooms (usually room (1)) was found to be spared for guests.[1]

This attitude to the guests' room and the family room has affected considerably their standards of furnishing and tidiness. Plates 21 and 22 show respectively the interiors of the family room and the guests' room in the same house type (a two-roomed house). The appearance of the family room is one of overcrowding and lack of arrangement. In addition to its normal functions of living, the room accommodates a large portion of the household furniture and possessions. It is sometimes also used for the performance of kitchen functions, such as cooking or making tea, and the storage of food and kitchen utensils (Plates 23 and 24). Bags and other equipment are placed haphazardly on its earth floor and clothes are hung against its lime-washed walls (Plate 25). In contrast, the guests' room is well maintained and less cluttered. Its floor is usually tiled and its walls oil painted. Against these painted walls are usually hung paintings and photographs to add to the pleasant appearance

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1. In some ways this is reminiscent of the concept of the parlour, still familiar in some parts of Britain. In reviewing the Building Research Station surveys, it was reported that in two-dayroom houses: "There was a noticeable tendency for the dining-room to be furnished as an everyday living room, whilst the living room, often the front room of the house, was furnished as the best room." HOLE & ATTENBURROW, 'Houses and People', HMSO, 1966, p. 20.

PLATE 25.
Clothes hung against walls of family room.

PLATE 26.
Photographs and paintings hung against walls of guest's room.

of the room (Plate 26).

One can therefore find reasons for the tenants' dissatisfaction with the sizes of both the family room and the guests' room. The former appears to have proved unsatisfactory because of the requirements of convenience and amenity; the latter mostly because of the requirements of prestige and social status.

(iii) TYPES AND ARRANGEMENTS OF FURNITURE

The furniture in the guests' room (i.e. room (1)) includes armchairs, easy chairs, big table (usually placed in the middle), coffee table and one or two steel beds arranged as shown in figure 24. Easy chairs were often stored in one corner of the room, stacked one on top of the other. In the evenings, these chairs and the plastic armchairs (shown in Plate 22) are usually moved to the verandah or the outer compound for sitting outside.

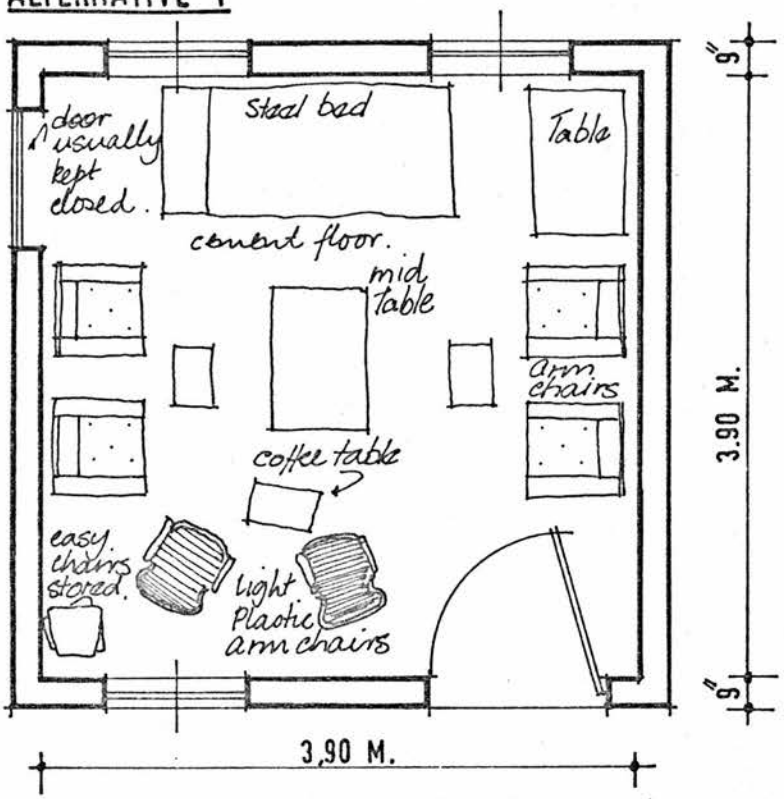
This type of furniture arrangement was the most popular; there were, however, few cases where the room was used for family living. These were mostly instances where the house was occupied by two families at the same time. In such cases, the room and its compound have been separated from the rest of the house, usually by a dividing wall, and used by the second family for purposes of daily living. Its furniture was found to include two or three beds, a cupboard and a few chairs.

The furniture in the family room (i.e. room (2)) is usually of a more permanent nature. In addition to the heavy

figure 24:

ALTERNATIVE ARRANGEMENTS OF FURNITURE IN ROOM (1) (scale 1:50)

ALTERNATIVE 1

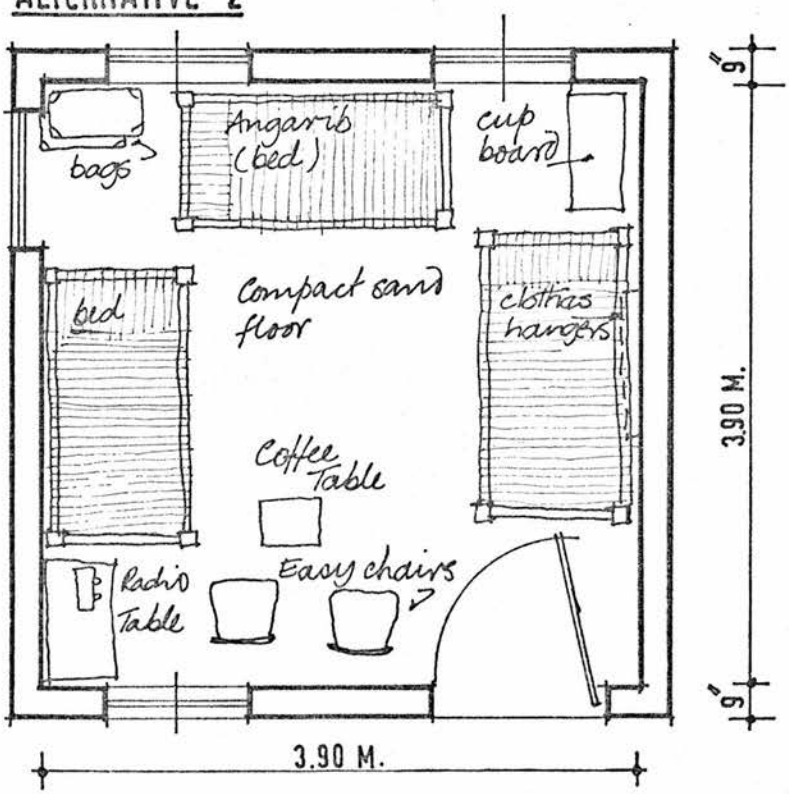


1) THIS ARRANGEMENT IS MOST COMMON AMONGST HOUSES OCCUPIED BY ONE FAMILY ONLY.

2) THE ROOM IN SUCH CASES IS USUALLY RESERVED MAINLY FOR ENTERTAINMENT OF GUESTS.

3) IT IS USUALLY WELL FURNISED AND BETTER KEPT. CEMENT FLOORS ARE QUITE POPULAR.

ALTERNATIVE 2



1) THIS ARRANGEMENT IS FREQUENT AMONG HOUSES OCCUPIED BY MORE THAN ONE FAMILY.

2) THE ROOM IN SUCH CASES IS SEPERATED FROM THE REST OF THE HOUSE BY A DIVIDING WALL AND FURNISHED FOR USE BY THE ETHER FAMILY.

3) THE FURNITURE (PARTICULARLY BEDS) IS OF TRADITIONAL HEAVY TYPE.

angaribs[1] placed permanently at its wall sides, the room usually contains a cupboard, a big table, chairs and sometimes a sewing-machine. The cupboard was sometimes placed against the window, thus blocking natural ventilation and making it difficult to open or close the window. Figure 25 shows a typical arrangement of furniture in the family room. It can be seen that the room is too overcrowded with items of furniture and equipment. No doubt the pressure on this room can be reduced by encouraging a more balanced distribution of furniture and activities among different rooms (e.g. through the provision of verandahs and stores).

(iv) THE THIRD ROOM: ROOM (3)

Room (3) is, of course, found only in house type (1) (i.e. the three-roomed house type). The use to which this room is put varies from one house to another. In some houses it shares the functions of room (2) - and this helped to reduce the pressure on the latter - and in other houses it was preserved for parents sleeping. Although parents seldom sleep indoors, it seems that the room is furnished and preserved mainly for this function. Its level of furnishing was sometimes of a highly sophisticated quality. It accommodated a double bed, a child's bed, a sideboard, a wardrobe, clothes hangers and one or two chairs arranged as shown in figure 26.

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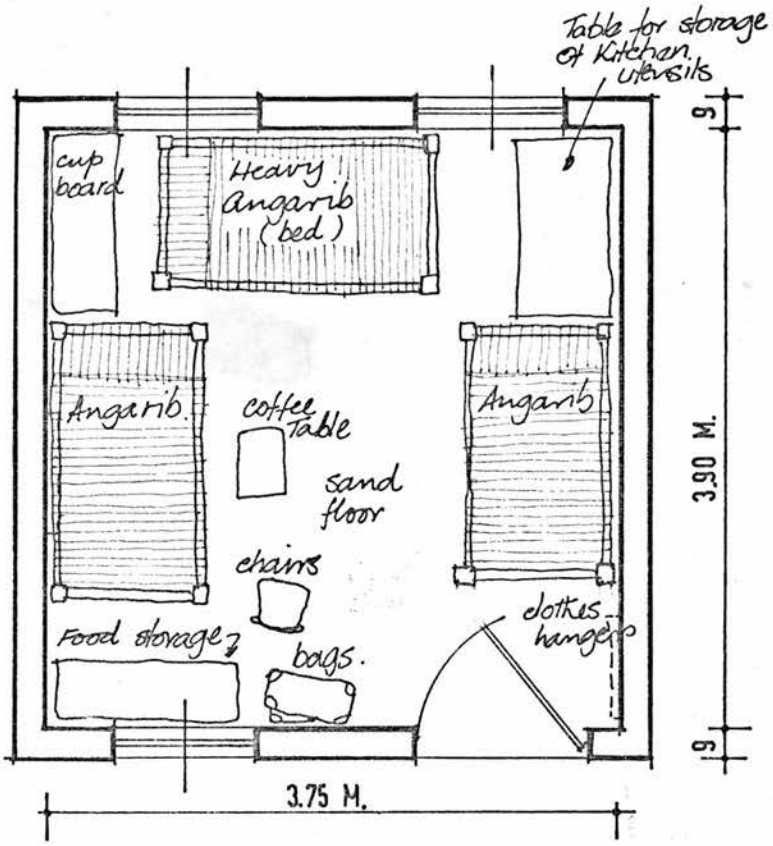
1. The angarib is the traditional bed; see Plate 12.

figure 25:

ARRANGEMENT OF FURNITURE IN ROOM (2) (scale 1:50)



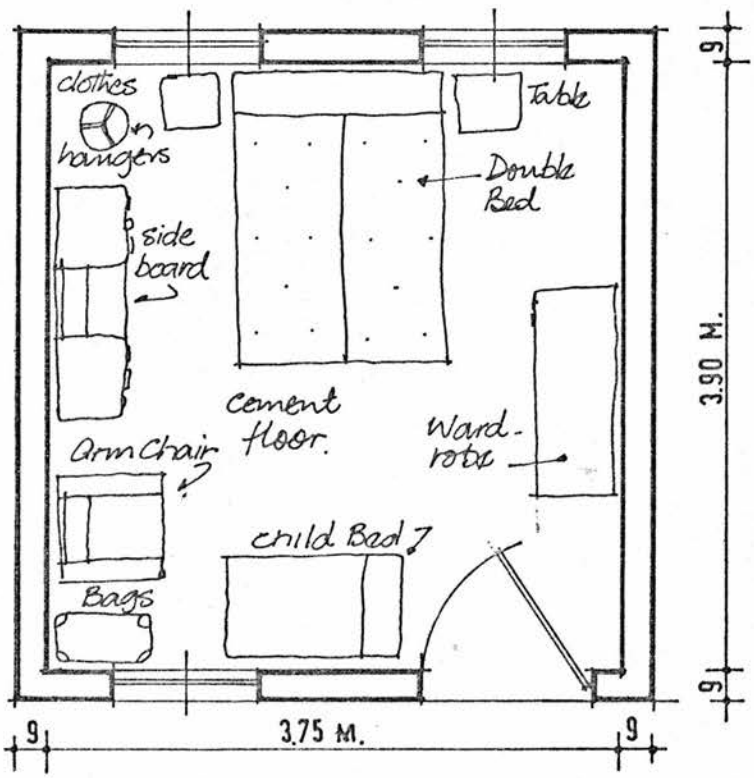
1) THE APPEARANCE OF THE ROOM IS ONE OF OVERCROWDING & BAD ARRANGEMENT.

2) THE ROOM IS USED MAINLY FOR THE STORAGE OF FAMILY POSSESSIONS & KITCHEN EQUIPMENT.

3) BEDS ARE USUALLY OF A HEAVY TYPE AND ARE PLACED PERMANENTLY AGAINST THE ROOM WALLS.

figure 26:

ARRAGEMENT OF FURNITURE IN ROOM (3) (scale 1:50)



1) THE ROOM IS OFTEN FURNISHED AND RESERVED MAINLY FOR PARENTS SLEEPING.

2) ITS LEVEL OF FURNISHING WAS SOMETIMES HIGHLY SOPISTICATED.

3) FURNITURE INSIDE THE ROOM WAS SOMTIMES BADLY ARRANGED.

(v) THE PROBLEM OF THE KITCHEN

Room (4) was originally designed as a "kitchen". About half the families in house type (2) and nearly one-quarter of those in house type (1) reserved the room mainly for sleeping and children's playing; meals were performed elsewhere.[1] The majority of other families used the room simultaneously for living and cooking, storage of food and storage of kitchen utensils. In the majority of such cases, its furniture was found to include one or two beds and a small cupboard for keeping food utensils; figure 27. The room was seldom used for the preparation of kisra (local bread); only 6% of families used the room for kisra baking.[2]

There are, however, various reasons to explain why the room was not used for meals. In the first place, the shortage of rooms, particularly in house type (2), motivated some of the families to use it as a bedroom. Another reason, which was frequently given by housewives, is that 'the kitchen has a cement floor'; housewives were keen not to spoil its appearance with the smoke and ashes which accompany the preparation of kisra. The third reason for not using room (4) for meals is that the preparation of meals is usually performed simultaneously with other housewives leisure pursuits. For example, the housewife can be listening to the radio or

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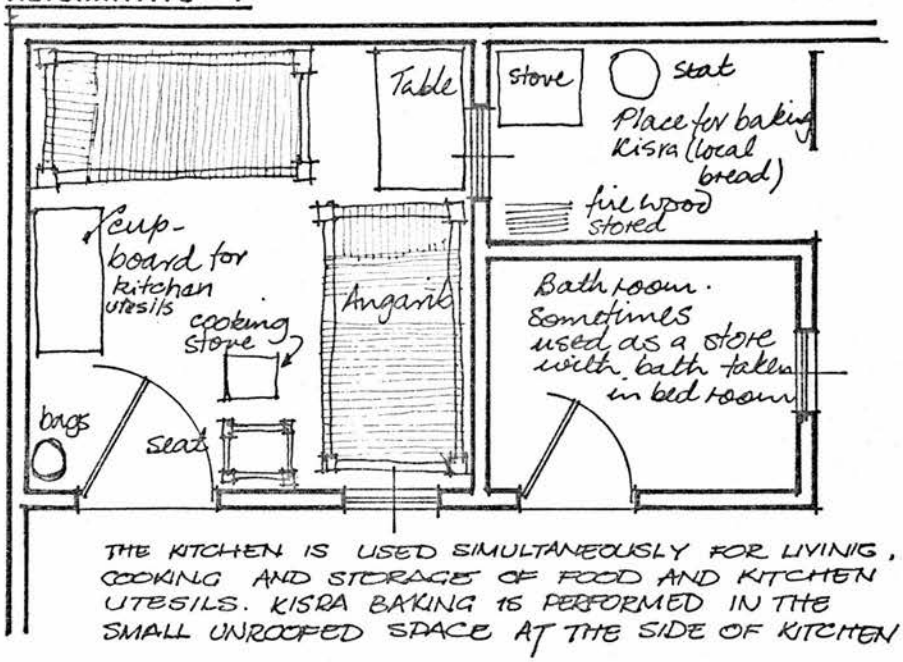
1. In these cases, the kitchen's usual functions were shared between the family room, the verandah and the open space in the compound: food and kitchen utensils were stored in the family room; kisra baking was performed in the small unroofed space behind the bathroom and cooking was done in the family room, the verandah or the plot depending on the time of day and the corresponding weather conditions.

2. Appendix 5, Table 12a.

figure 27:

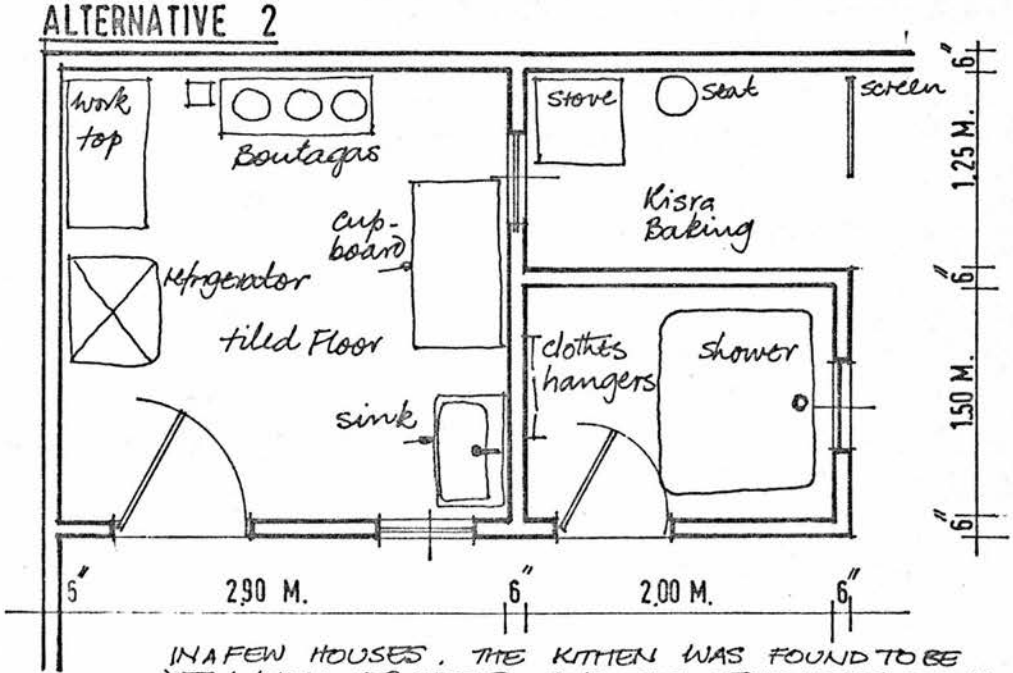
ALTERNATIVE ARRANGEMENTS OF FURNITURE AND EQUIPMENT IN ROOM (4) (scale 1:50)

ALTERNATIVE 1



THE KITCHEN IS USED SIMULTANEOUSLY FOR LIVING, COOKING AND STORAGE OF FOOD AND KITCHEN UTESILS. KISRA BAKING IS PERFORMED IN THE SMALL UNROOFED SPACE AT THE SIDE OF KITCHEN

ALTERNATIVE 2



IN A FEW HOUSES, THE KITHEN WAS FOUND TO BE VERY WELL EQUIPPED, BUT THE EQUIPMENT ITSELF WAS BADLY ARRANGED THIS ALTERNATIVE ARRANGEMENT WAS OBSERVED IN FEW OF TYPE (1) HOUSES.

entertaining her women friends whilst cooking her food or preparing her afternoon tea. Such functions are performed in the room, the verandah or the compound depending on climatic conditions.[1] The preparation of meals is in fact not a separate job that needs a completely separate accommodation, but an integral part of the housewife's living functions and will need to be catered for jointly with the housewife's daily living space; (see Chapter 6).

5.4 THE VERANDAH

Verandahs are the most common types of construction to have been added to both house types in the sample. Moreover, in asking heads of households about suggestions for additional constructions to their houses, 28% placed first priority on the provision of another verandah.[2] To understand the different uses of the verandah it will be necessary to describe briefly the social, climatic and functional factors which lead to its development in the traditional Sudanese house.

(i) USE OF THE VERANDAH IN THE TRADITIONAL HOUSE

In the traditional house, the rakuba[3] (figure 28a) has always been the place for family living. The traditional family, as we have seen earlier, was 'society oriented', and the rakuba with its open sides offered a chance for members of the family to open into society. There were no compound

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1. See later, Chapter 6; A REDEFINITION OF FUNCTIONS...
2. Appendix 5, Table 16a.
3. The rakuba is a self-supporting wooden framework carrying a roof of straw or thatch.

walls surrounding rooms and rakubas in the house, and the groups of men or groups of women sitting in their rakubas had the chance to see into the community around them, to welcome passers-by and to live within sight of their neighbours.

In the traditional house, too, rooms with their characteristic small windows gave little opportunity for natural ventilation and lighting, and since artificial means were not available, conditions inside the room became intolerable. The rakuba, placed at the East end of the family room, provided a well-lit and well-ventilated space for living, and also protected the walls of the room itself from exposure to low sun (figure 28a).

For these social and climatic reasons, the rakuba became a common feature in the traditional house. But it came to be realised later that the rakuba with its self-supporting framework and its thatch or straw roof was less permanent than the structure of the main rooms to which it was usually attached. The sala (or hall) came to replace the rakuba. While preserving to some extent the advantages of the openness of the latter, the sala has the additional advantage or providing more protection against low sun, and also of being more permanent, as it was usually constructed of the same material as the room (figure 28b). The sala was usually sited so that its doors face North and South (directions of the prevailing breeze), in order to give maximum ventilation.[1]

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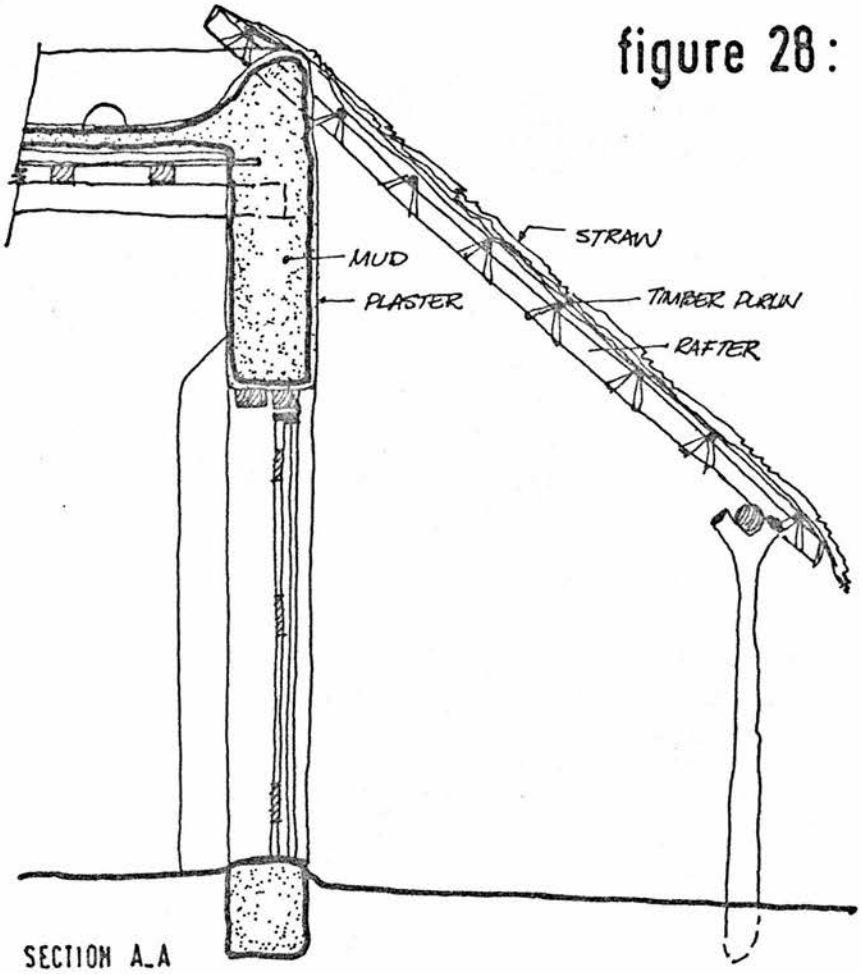
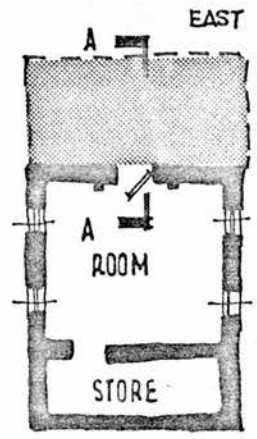
1. For further description see, BRAUSCH, CROOKE & SHAW, 'Bashaqra Area Settlements', ibid., pp. 102 - 107.

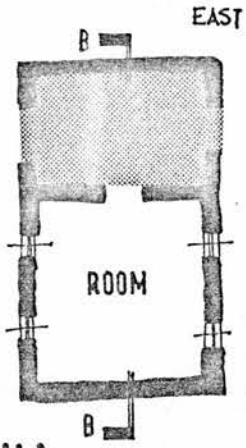
figure 28:



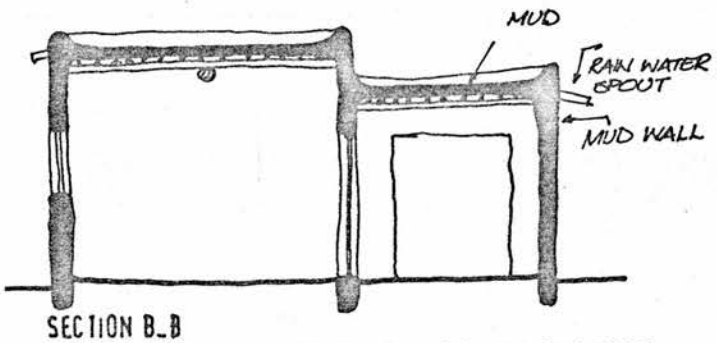
SECTION A_A
THE SELF_SUPPORTING WOODEN FRAMEWORK OF THE RAKUBA
Scale 1:50



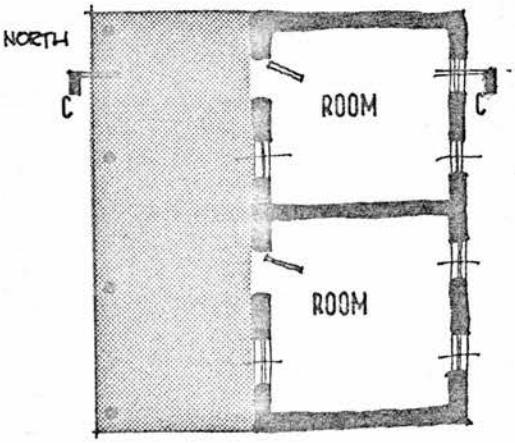
(a) THE RAKUBA



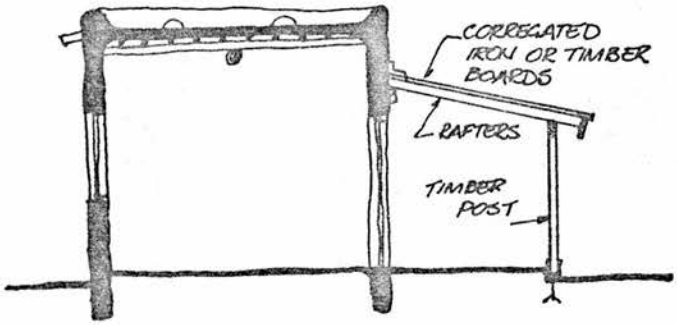
(b) THE SALA



SECTION B_B
THE SALA HAS THE SAME CONSTRUCTION AS THE ROOM



(c) THE VERANDAH
(scale 1:100)



SECTION C_C
THE VERANDAH HAS THE OPENNESS OF
THE TRADITIONAL RAKUBA

As it provided a secure, more private and well-defined space, the sala attracted more of the family activities both during the day and night, and also provided an extra room where furniture could be placed permanently. The sala attached to the women's room was used as a cooking and sitting area, and also for keeping drinking water jars. The women's room itself was reduced to nothing more than a store for family possessions. The sala attached to the diwan[1] was used for meetings of men, reception of guests and almost all male activities during the day.

The rakuba and sala were recently replaced by the verandah. The latter is similar to the early rakuba, in that it is open-sided, but its structure is more permanent. Also, while the rakuba and sala were placed against the East wall of the room, the verandah is usually located against the North or South walls of the room to protect both walls and windows from the sun, particularly at mid-day. As the verandah in the modern house opens on to a private courtyard, protected by the external boundary walls of the house, it is completely private. It therefore combines the advantages of the openness of the rakuba with the privacy and permanence of the sala (figure 28c).

Most of the functions traditionally performed in the sala are now performed in the verandah, but because the verandah is more open, furniture cannot be placed in it permanently. Portable items of furniture, such as light

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1. The diwan is the guests' room in the traditional house.

beds and easy chairs, are moved into and out of the verandah every day.

(ii) USE OF VERANDAHS IN THE SAMPLE

In the sample, verandahs were observed to be in continuous use for a major part of the day. At times, when both the room and the plot spaces are uncomfortably hot, the verandah is used a lot for cooking, sleeping, reading, resting and children playing. In the mornings and evenings, when it is reasonably cool, the use of the verandah is auxiliary to the open space in and around the house. Verandahs therefore share the functions of kitchen and bedroom during mid-day, and the functions of open spaces during the mornings and evenings.

Just as we were able to distinguish between the guest's room and the family room, we can distinguish between the guest's verandah and the family verandah. Most of the household tasks and household leisure activities during the day are performed in the family verandah (8), and in the kitchen verandah, where the latter has been added. The verandah (7) attached to room (1) is reserved mainly for the entertainment of guests and occasional use of male household members (e.g. an adult male having his afternoon siesta). As in the case of the guest room and family room, the guest's verandah is usually cleaner and less cluttered than the family verandah.

5.5 THE PRIVATE OPEN SPACE WITHIN THE COMPOUND (THE PLOT)

The grouping of rooms in both house types sub-divides the plot area into two compounds; an inner compound (9) and an outer compound (10). All families preserve the inner compound mainly for women and the outer compound mainly for men. But this division applies only in certain circumstances where there are guests in the house, or with regard to sleeping arrangements. For the rest of the time, the whole family (men and women) live in the same compound (usually the inner one).

It was already observed that the family room and the family verandah are far more in use than the guest room and the guest verandah. Similarly, the inner (or family compound) is more in use than the outer (or guest compound). The latter is only occasionally used for adult males sleeping during the night, or for the reception of guests. In contrast, the inner compound is usually in use for a major part of each day. It is used by the housewife in the early morning for various household duties, such as making tea, washing dishes, washing clothes, drying clothes, etc. It is used by the whole family in the evening for various leisure pursuits, such as listening to the radio, children playing, eating, resting or simply for family meetings. It is used in the night by the father, mother and their young children for outdoor sleeping.

Despite this relatively intensive use of the inner compound for everyday family living, the plans of both house types provide less area in the inner compound than in the

outer one. House type (1), for example, provides 63 square metres of inner compound and 110 square metres of outer compound area. To make things worse, most of the extensions made by the occupants after moving into the house were made in the inner family compound. This reduced substantially the area that could be effectively used for out-door family functions. At the same time, a major part of the area provided in the outer men's compound remained as 'no-man's land'. It cannot be used by guests because it is overlooking the window of the women's rooms; it cannot be used by women because it is not directly accessible to them, and also because it is overlooking the men's side of the house[1] (see figure 22).

The level of housekeeping varies from one house to another, but house type (1) appears to be better kept than house type (2). In many of the houses, however, little has been done to make the open spaces in the compound clean and habitable. There are no proper drainage systems. Waste water from the bathroom and zeer-house is allowed to drain into the compound and leads to mosquito-breeding, odours and other hazards. During the rainy season, surface water accumulates inside the compound and adds to the health dangers.

The compound 'is, in fact, at least as important in everyday living as are the rooms themselves'.[2] In the early

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1. These are other reasons (apart from increase in household size) which account for dissatisfaction with the size of the plot.

2. G. BRAUSCH, P. CROOKE & J. SHAW, 'Bashaqra Area Settlement', ibid., p. 107.

mornings, evenings and nights, rooms are usually hot, dark and insufficiently ventilated. Verandahs are not completely open to the prevailing breeze. During these hours most of the household functions are catered for in the compound. The latter provides a private space where children can play, guests can be entertained, women can perform most of their household duties and where members of the household can enjoy the pleasure of outdoor sleeping, gardening, etc. The private open space is also used for occasional family functions, such as weddings and funerals.

At present, the compound spaces provided in the houses are not fully utilised. To encourage more efficient use of such spaces it will be necessary to secure further privacy for different groups of household members through careful planning. Gardens, other than their climatic and psychological advantages, can help in the development of tenants' interests for the improvement of their houses, and this interest must be encouraged. There is also need for effective means of waste water and storm water disposal. The present system of opening trenches every season for collection of storm water does not seem to be very effective because the water often accumulates inside the house and does not find its way to the trench. Refuse disposal presents another problem. House to house collection of garbage may not be hoped for at present (for reasons of cost) but there is need for more communal refuse disposal points. The points are needing to be supervised and collection is needing to be done more frequently so as to protect the open spaces around the houses.

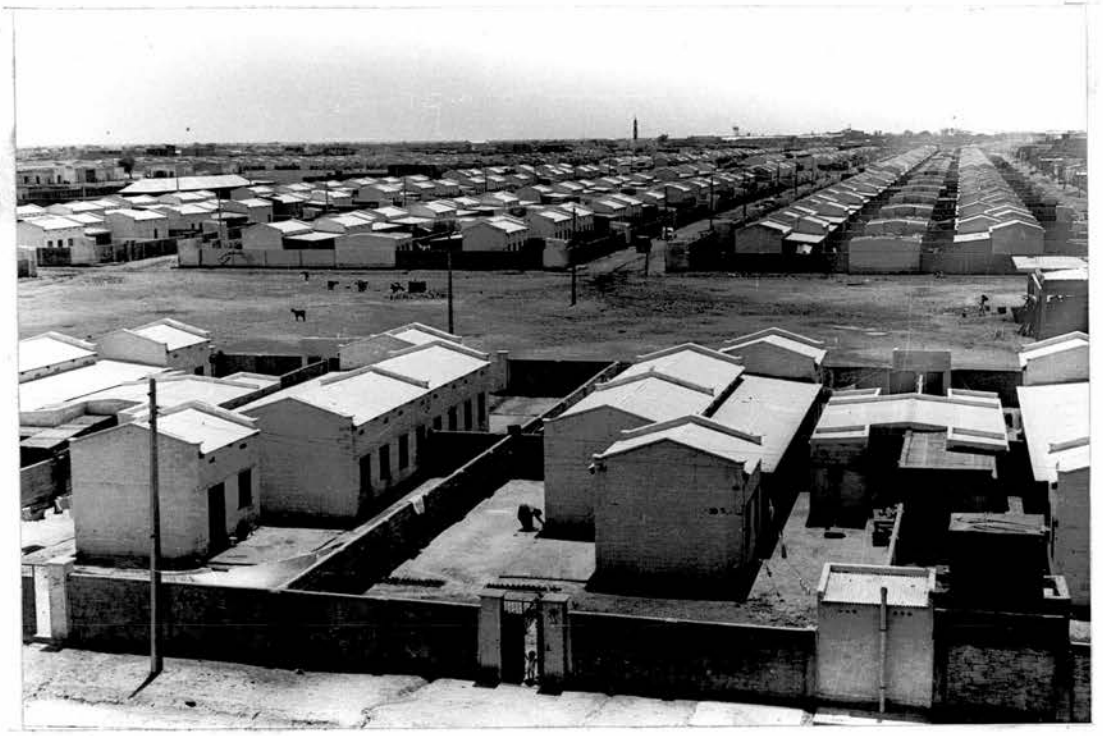

PLATE 27.
The open spaces around the houses.

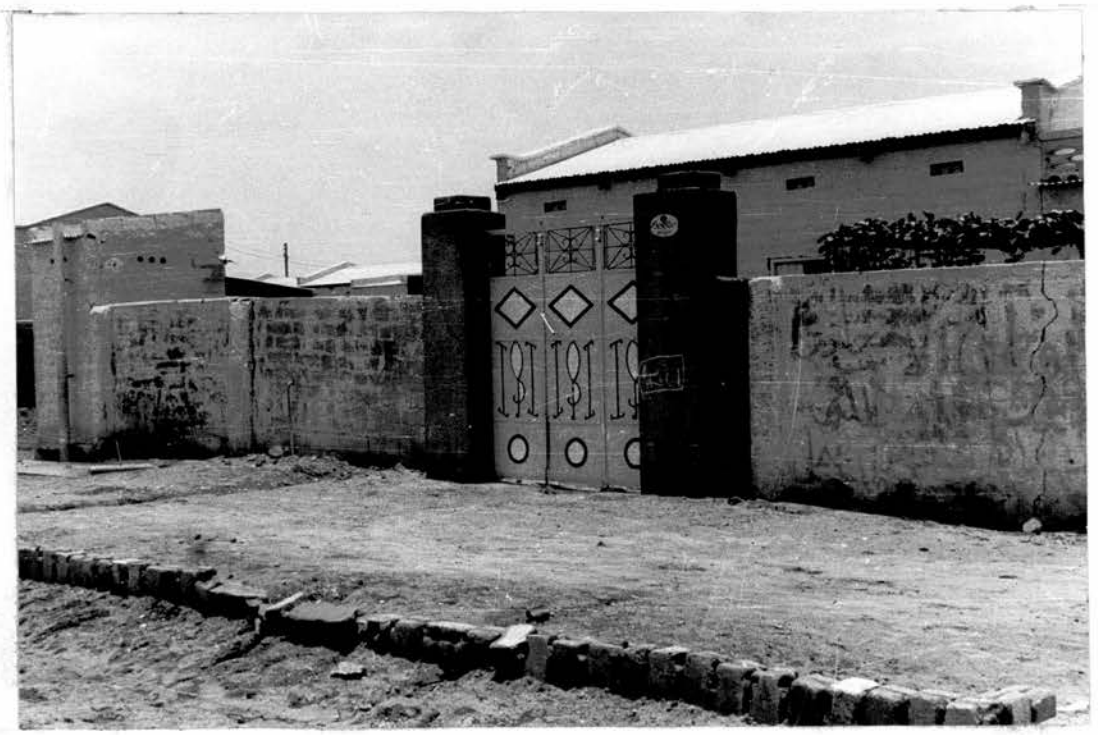

PLATE 28.
"The street of one's own."

5.6 THE STREET AND THE ADJACENT PUBLIC OPEN SPACE

The additions made by the occupants inside their plots reduced substantially the size of the open space in the plot available for outdoor functions. This, together with other social and climatic reasons, means that some of these functions have to be performed outside the boundary walls of the plot (e.g. in the street and the adjacent public open space).

The street and the public open space are used for various household functions, such as children playing, entertaining guests, celebrations (such as weddings) and for sitting out. About half the households in the sample, for example, use the street for children playing, and about 40% for wedding celebrations. Public open space is less well used; for instance, 10% of heads of households said that their children played there, and only 14% had used it for family celebrations.[1]

The street, however, is not private, nor is it safe from motor traffic.[2] The open spaces around the houses which were originally intended to cater for children playing, etc. are seldom used. These spaces are not only accessible to motor cars, but are also dirty, messy and unattractive; Plate 27. Families from surrounding houses appear to use these spaces for the disposal of their garbage; animals such

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1. See Appendix 5, Tables 12b and 12c.
2. It will be remembered that the minimum width of the street is 10 metres.

as goats add to the unpleasant appearance of these spaces. None of the authorities' efforts to convert them into clean, usable spaces have produced any appreciable results. It seems that the spaces themselves are too big and too detached from the houses to stimulate a feeling of intimacy and belonging among the residents.[1] This very fact has been observed by the director of the National Housing Authority when he wrote about the layout as follows:

> "The open spaces, which are so important to the communal life of the Sudanese, and which are handled with much delicacy and understanding in the pilot scheme of 1953/55 (i.e. the Deims Project) were almost ignored in 1959 (i.e. the Khartoum North Project) when the layout no longer inspires intimacy and the spirit of comradeship. They are no longer safe for children to play in the early mornings or evenings for they are open to vehicular traffic. They are too big as to be

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1. This feeling of belonging is probably more relevant in the case of the street. It seems that each family regards the part of the street opposite its house as part of the private domain, and that only its members are entitled to its full use. For this reason, some of the occupants have planted trees in (their) side of the street, while others simply marked it by building a dwarf wall and filling it with sand; Plate 28. Also, in the case of celebrations, the family sees no harm in planting a tent in the street to welcome their guests and thereby blocking it completely in the face of motor traffic.

   It is interesting to find that similar problems are met with in British housing estates. For example, a study undertaken by the Architecture Research Unit, University of Edinburgh, points to confusion arising as to how far the dwelling was seen to extend beyond the immediate front door territory. The study suggests that the rights and responsibilities for such spaces as access balconies, stair landings and semi-private open spaces should be clarified. ARCHITECTURE RESEARCH UNIT: UNIVERSITY OF EDINBURGH (1968), 'Low Rise High Density Housing Study' (unpublished manuscript), See also: another study by the unit reported by BYROM, J. 'Rehabilitation Case Study: Niddrie Mill, Edinburgh'. Housing Review, Vol. 18, No. 3, May-June, 1969, pp. 89 - 94.

in keeping with the scale of the surrounding houses. In short, they are becoming rubbish dumps and dust bowls."[1]

Although the Khartoum North Project is therefore too generous in the provision of streets and open spaces around houses,[2] neither of these spaces is efficiently or economically utilised. The streets are misused, and the open spaces are neglected and a menace to health. The most important reasons behind this lack of economy in the use of space seems to be connected with the layout.

To demonstrate further the effect of the layout on the utilisation of space in housing areas under the Sudanese conditions, we will cite the example of the New Deims. The New Deims Project, built in 1953, is characterised by its relatively modest standards of space provision (both inside and outside the plot)[3] and also by its attempt to break away from the conventional grid-iron layout that characterises almost all other projects. In the Deims layout, each group of houses was provided with a semi-private open space, separated completely from vehicular routes, and left entirely

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1. A. HAMID, 'A Case Study on the Khartoum North Housing Project', ibid., p. 15.
2. The Project is built at a density of 7·2 houses to the acre. Roads and public open spaces occupy 38% of the site area. Every individual in the scheme is provided with 17·2 square metres of road space in a time when car ownership is about 1 for every 25 households.
3. The Deims Project is built at a density of 11·2 houses per acre, while Khartoum North Project is built at 7·2 houses per acre and Khartoum New Extensions at 5·4 houses per acre.

figure 29:

LAYOUT OF THE NEW DEIMS PROJECT

Borrowed from S. FAWZI "Social Aspects of Low Cost Housing in the Northern Sudan." Khartoum, 1954.

Community open spaces

for household and community functions (figure 29). S. Fawzi wrote about the New Deims Project:

> "The fundamental improvement which has taken place is, however, not in the design of the individual house but in the grouping of the houses as a whole.....It has not been possible to get away completely from the rectangular grid-iron pattern.....But it has been possible to group the houses in a way which will make it possible for the family doors to open on certain squares. These squares are to serve a number of functions. They are to be playing grounds for children and centres of social functions of the people, e.g. marriages. Motor vehicles will not be allowed in the squares, for the entrances to them will be blocked by narrowly spaced posts."[1]

The survey of the New Deims[2] showed that these squares, or semi-private open spaces, are now used intensively for various household and community social functions. Over 80% of families in the Deims sample said that their children usually play in these semi-private open spaces, and about 40% of them said they use these spaces for family celebrations (Tables 8 and 9). Not only did these semi-private spaces provide safe playing areas for the young, and private meeting areas for the old, but they also seem to have stimulated a sense of intimacy among the residents. Some of them participated in planting trees in these spaces, whilst in one case,

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1. S. FAWZI, ibid., p. 15.
2. A survey carried out by the author in the summer of 1967; see Chapter 1.

the residents in the surrounding houses provided facilities in their private spaces for children playing. These open spaces have also attracted various other space-demanding activities from the home, such as entertaining guests, saying prayers, carrying out an odd job, celebrating occasions or even having an evening or afternoon siesta. It was therefore not unusual to see various items of furniture, such as chairs, beds and prayer mats, moved out to the open spaces.

It may be argued whether some of the functions which are now accommodated in these semi-private open spaces were attracted to it by choice or by necessity (due to the lack of adequate space inside the plot).[1] Without doubt, if the spaces around the dwellings are carefully planned they will attract more of the household functions,[2] and can, in this way, reduce pressure on space inside the dwelling. At the same time, many household functions are private in nature, and will need to be provided for inside the compound. The importance of open space around the dwelling must, however, not be overlooked when specifying space standards for the dwelling itself. It may be possible to accept a relatively modest standard of space inside the plot on the assumption that part of the household functions are catered for in the open spaces associated with groups of dwellings.

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1. The average plot size in the Deims Project is 200 square metres, compared to 300 and 250 square metres in house type (1) and (2) in Khartoum North Project respectively.
2. Probably those which are space-demanding.

TABLE 8

PLACES WHERE CHILDREN USUALLY PLAY

(More than one play space was sometimes given)

Project	Rooms %	Verandahs %	Plot %	Street %	Adjacent Open Space %	Others[1] %
Khartoum North (House Type (1))	14	36	69	49	11	5
Khartoum North (House Type (2))	14	19	53	50	8	0
New Deims	11	19	60	80	80	1
Khartoum Extensions[2]	3	8	58	48	4	1

TABLE 9

PLACES WHERE BIG FAMILY OCCASIONS ARE USUALLY HELD

Project	Plot %	Street %	Adjacent Open Space %	Far Open Space %	Others[3] %
Khartoum North (House type (1))	60	39	13	4	9
Khartoum North (House type (2))	53	42	14	1	3
New Deims	32	31	39	0	15
Khartoum Extensions	40	27	7	5	23

1. e.g. the far open space.
2. Khartoum Extensions have layouts almost similar to those of Khartoum North.
3. e.g. neighbour's house.

5.7 SUMMARY

Apart from the rapid increase in the sizes of households, various socio-cultural and climatic factors have contributed to the demand for more space:

1) In response to the desire for the separation of sexes, the house plan provided two separate compounds for the performance of family living functions. But the requirements of prestige and social status encouraged the whole family of eight or nine people to perform most of its functions in one of the compounds leaving the other almost entirely for guests. The family compound and the family rooms and verandahs were therefore excessively overcrowded, while the guest's compound and rooms were usually less cluttered, well maintained and only occasionally used. This raised the demand for more space, particularly in the 'family side' of the house.

2) Within the family side (or the guest's side), not all the accommodation available could be comfortably used throughout the day. The family functions are performed in the room, the verandah or the compound depending on the time of day and the corresponding weather conditions. There were therefore times when the whole family was living in the same room and this produced even more pressure.

3) The question, however, is not only one of more space, but also of types and organisations of the spaces to be provided. The terms 'house', 'room' and 'kitchen', with their present connotations, seem to be inadequate for describing types of spaces to be provided in the Sudanese home.

The house, for its occupants, is not only the area within the compound walls, but also all that area within the immediate surroundings of the compound. The concept of room as a three-dimensional space, enclosed by walls on its four sides, is climatically inadequate. The kitchen, as a type of 'room' in which the housewife does her cooking and baking does not describe the true situation, because cooking, baking, as well as most other household duties, are performed integrally with other leisure pursuits.

So far, this difference between the planning concepts and the use concepts has resulted in a situation where the spaces provided in and around the houses were either misused or inefficiently utilised. For example, the street, designed for the motor car, was considered part of the private family domain and was therefore used for various family functions. At the same time, the open spaces around the houses, designed for such functions, were too big and too detached from the houses to stimulate a similar feeling of intimacy and belonging.

To encourage a more efficient utilisation, therefore, it will be essential to redefine the functions performed in the home in terms which implicitly recognise and express the strong influence that the climate and social life of people have in shaping the types of spaces to be provided. Having redefined the functions, it will be essential to find the type of house that will provide for them in the most efficient ways and yet leave room for users' different needs, personal interests, and choices. These are the aims of the next part of the study.

PART TWO:

SPACE STANDARDS FOR LOW-COST HOUSING OF CENTRAL SUDAN

CHAPTER 6: A REDEFINITION OF HOME FUNCTIONS

6.1 INTRODUCTION

The conclusion to be derived from the case study is that the space requirements in the Sudanese home are not so much for the activities performed as they are for some related social, psychological and climatic factors. Apart from activities, the need for space in the home is substantially influenced by the desire for separation of sexes, for privacy of womenfolk against visitors and passers-by, for displaying the family's prestige and social status, for thermal comfort at different hours of the day and for simply having an area of one's own. Not only do these factors affect the need for space in the home, but also the meaning and physical extent of the home.

The purpose of this section is to redefine the functions of the Sudanese family home and to analyse their space and general design requirements. The requirements of different types of families will be discussed in more detail in the next section.

6.2 GROUPING OF FUNCTIONS

The range of functions that the family home has to satisfy is becoming increasingly wide and complex. This made it difficult to analyse, at the same time, all different functions and to compromise between their different (and sometimes contradictory) requirements. Recent European studies have approached the problem in a generic way;

starting from activities performed in the home, recognizing their relative importance in the life of the individual, family and society, and then assessing their requirements in terms of space, atmosphere, efficiency, comfort, furniture and equipment, etc.[1] These methods have provided good bases for the design of the European family home but their application to the Sudanese family home is met with two main difficulties.

In the first place, most activities - as we have seen earlier - realize no specific place in the home for their pursuit. The individual activity (such as guest's entertainment) is performed in the men's side or the women's side of the house; in the room, the verandah, the compound or even the street depending on such things as sex of people involved, time of day and weather conditions. This makes it difficult at the outset to foresee a certain arrangement of activities and items of furniture around which to design or for which to assess the space requirements.

In the second place, the occupants are less concerned with how different spaces in the home were tailored to suit different activities than they are with how the OVERALL accommodation and the OVERALL space are suitable for various

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1. See for example:
   (i) MOHLG (BRITAIN); "Homes for Today and Tomorrow"; HMSO, 1961 (particularly page 4).
   (ii) MOHLG (BRITAIN); "Space in the Home"; HMSO, 1963.
   (iii) MOPBW (BRITAIN); "Activity Data Method"; HMSO, 1966.
   (iv) HOLE, W.V. and ATTENBURROW, J.J. "Houses and People." ibid.
   (v) CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION "Farmhouse Planning Guides." 1959.

socio-functional and climatic requirements of the WHOLE family (such as separation of sexes, comfort conditions, etc.)[1]

What is required therefore is to analyse a TOTAL socio-functional and climatic situation of which activities and their requirements form only one attribute.

In fact four such situations can be distinguished to take place in the house during the day. It will be shown later that the social, functional and climatic environment of the home changes significantly between morning, afternoon, evening and night. For example, the situation in the afternoon differs considerably from that in the morning in terms of climatic conditions, people present at home, their social requirements, the type of activities performed and the places where activities are performed, etc.

It will of course be possible to analyse the house functions during the 24-hour cycle of the day; but the requirements of functions are found to change significantly between these four instances (i.e. morning, afternoon, evening and night).[2] If the requirements at each instance were carefully analysed, it may be possible to arrange the

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1. The evidence for this statement is provided by the fact that most of the reasons for satisfaction with the house centred around family size, number of families in the house, privacy between sexes etc. Only very few mentioned activities or furniture arrangements; see Chapter 4.

2. The terms 'morning', 'afternoon', etc. are used in a broad sense to refer to changes which take place in the climatic and social environment of the home. Such changes of course take place gradually and cannot be easily defined by very precise time limits.

space in the home so as to achieve more economy and more efficiency through overlapping of functions and multi-use of space.

6.3 ANALYSIS OF FUNCTIONS

(i) UNIFORMITY IN PATTERNS OF DAILY LIVING

A study of patterns of living in 53 different households in the sample revealed striking similarities.[1] In almost all households women have no outside employment. Their responsibility lies mainly in keeping the house and looking after the household. Their time at home is divided between household tasks and leisure pursuits which are carried out simultaneously or sequentially to fill in their day. The ways in which these are carried out are almost similar in all households and in the same household during all days of the week. For the working man, the time of day is divided between four major activities; work, rest, family meetings and community meetings. Most working men in the sample are employed as labourers, and for labourers the working day is slightly longer than for other employees in clerical and managerial jobs. This means that most working men in the sample have roughly the same length of time at work and at home.

A few families break away from this routine. Some of these are families where the housewife has a form of outside employment. Out of the six families with employed housewives

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1. One in five of the informants in the main sample were asked to give details of their activities over the preceding day.

three have appointed servants on part-time basis to undertake part of the household duties, but the housewife usually does some housework when she returns in the afternoon. The daily patterns of living are also slightly different among the few families (5%) who own a television set. Members of these families have reported fewer outings and more family gatherings at home around the television. The impact of the television has not yet been felt - at least among this population group - but one can imagine that with further popularity of the television, members of the family are likely to be more 'home oriented' and this will raise the additional demand for more and better space in the home as witnesses the European experience.

(ii) MORNING FUNCTIONS

These are assumed to start with the departure of husband and school children in the morning (around 7 a.m.) and end with the return of school children in the early afternoon. The weather is usually comfortably mild in the early morning but it gradually becomes warm as the morning goes on till it reaches maximum temperature around mid-day.

Morning functions are mainly the concern of the housewife and other adult women in the household. After husband and school children leave home, the housewife is usually involved in various household tasks. Almost all housewives prefer to do their household duties in the morning 'before it gets hot'. Also, as meals are prepared in the morning, they can be served immediately as husband and school children

arrive home in the afternoon. Apart from meals, the housewife's time in the morning is spent on other tasks such as sweeping rooms and verandahs, washing dishes, caring for young children and occasionally washing clothes or cleaning the compound.

Early morning activities are performed in the open space inside the compound, but as it gets warmer, the usable part of the compound is limited to the area shaded by walls. Late morning activities (10 to 12 a.m.) are usually performed in the verandah or room.

Even in cases where the housewife gets some help from an adult woman in the household (e.g. a grown up daughter), household tasks are usually extended to fill in most of the women's time in the morning. Women seem to find some pleasure in performing these tasks collectively; they usually sit together in the compound or verandah listening to radio or entertaining women friends whilst performing various tasks at the same time.

Figure 30 analyses morning functions of the home and describes their space and general design requirements. The evidence suggests that the house should provide at least two types of habitable spaces: adequate[1] open space inside the compound for early morning activities and adequate roofed

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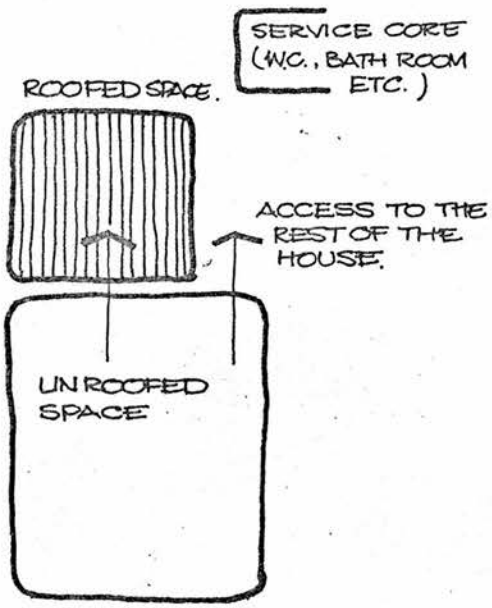
1. The author agrees, in principle, with the view held by Parker Morris Committee that: "Given (minimum dwelling sizes) the designer should be free to arrive at the best way of arranging the space and equipment to meet the requirements of particular sizes of family." See: MOHLG (BRITAIN); "Homes for Today and Tomorrow". Ibid., p. 4.

figure 30:

ANALYSIS OF MORNING FUNCTIONS

DETAILS OF FUNCTIONS		REQUREMENTS OF FUNCTIONS
Time	7.00a.m. to 12.00a.m.	1) The design should provide adequate open space inside the plot for simultaneous use by adult women and young children as well as such functions as clothes drying.
People present	Mother, adult women and children under school age.	
Climatic conditions	Comfortably mild in the morning but gradually becomes warm as the day goes on. It becomes uncomfortably hot around mid-day.	2) This space should be protected from inlooking by neighbours, passers-by and unexpected male visitors.
Activities performed	Early morning hours spent on various household tasks, e.g. sweeping rooms, washing dishes and caring for the young. Late morning spent on preparation of meals.	3) It should be sanitary and easy to clean with facilities for water supply and refuse disposal.
Places	The compound spaces in the early morning and rooms & verandahs in late mornings	4) It should have direct access to a well ventilated roofed space for use at late hours in the morning when it becomes hot in the open space.
LAYOUT AND SPACE REQUIREMENTS		5) This roofed space should be big enough to cater for both household tasks such as preparation of meals, and leisure activities such as entertainment of women friends.
		6) Cooking facilities should be provided within or close to this roofed space. To make the process of food preparation both healthy and pleasant, there should be a sink (or water tap) and a working top. There should also be a place for the storage of food before and after cooking (e.g. a fly-proof cupboard) and a place for the storage of utensils (e.g. shelves).
		7) There should be direct access to the rest of the house for cleaning and supervision.

MINIMUM SPACE REQUIREMENTS

TOTAL	ROOFED	UNROOFED
60 SQ.M	20 SQ.M.	40 SQ.M.

space for late morning activities within or close to which there should be facilities for cooking.

(iii) AFTERNOON FUNCTIONS

Afternoon functions are the concern of the whole household. They start with the arrival of school children (between mid-day and 1.0 p.m.) and continue till about 5 p.m. when adult males are ready to leave home again. During this time it is usually hot outside and most family activities are centred in the roofed part of the house (rooms and verandahs).

With the arrival of school children in the early afternoon the mother starts serving meals. This continues for an average period of two hours during which young children first have their meal, then the mother and her daughters and last, the husband who is usually back from work around 3 p.m. Unless there are guests, usually all meals are taken in the women's part of the house where members of the household can at the same time have a chat or discuss family matters etc. After the mid-day meal is over, adult males usually go on to read the papers or rest while adult women start washing and clearing up. Conflicts often arise between adult males reading their papers or wanting to sleep and children playing. Occasional use is therefore made of the guest's room and verandah for adult men's sleeping and resting.

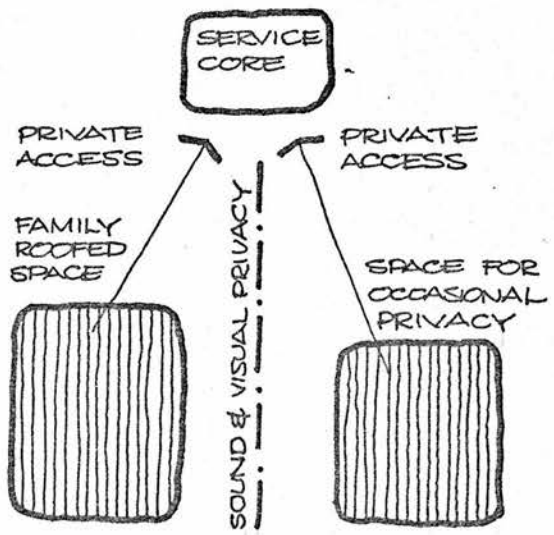
Figure 31 describes afternoon functions of the home and analyses their design requirements. The evidence suggests the provision of at least two separate roofed living spaces;

figure 31:

ANALYSIS OF AFTERNOON FUNCTIONS

DETAILS OF FUNCTIONS		REQUREMENTS OF FUNCTIONS
Time	12.00a.m. to 5.00p.m.	1) The design should provide at least two separate habitable roofed spaces for family living during the day.
People present	All members of the household.	2) These spaces should be well ventilated and there should be adequate means for protection against glare, occasional rain and dust storms.
Climatic conditions	Uncomfortably hot around midday but becomes cooler towards the evening.	3) At least one of these spaces should be of a size adequate to accomodate all members of the household performing various activities simultaneously (eg dining, resting and sleeping)
Activities performed	Having meals in the early afternoon; resting, sleeping, reading and washing in the late afternoon.	4) The other space should be placed such as to insure sufficient privacy and should have direct and private access to such facilities as W.C, bathroom, zeer house and external entrance to the house.
Places	Rooms and verandahs.	5) Both rooms should have sufficient space for the storage of clothes, linen and other household possessions.

LAYOUT AND SPACE REQUIREMENTS



MINIMUM SPACE REQUIREMENTS

TOTAL	ROOFED	UNROOFED
4 SQ. M. PER PERSON	4 X FAMILY SIZE	—

one to house all family members performing various tasks plus necessary furniture, and the other for occasional privacy and for the reception of guests arriving in the afternoon.

(iv) EVENING FUNCTIONS

Evenings are usually reserved for social functions such as family meetings and community meetings. These are performed in the open spaces within and around the compounds.

In the early evening, portable items of furniture and equipment are moved from rooms and verandahs onto the compound. Women spend most of their time in the evening in the inner compound listening to radio or entertaining women friends and performing light household tasks. Men either receive visitors at home or go out to meet friends in the street or open space to say prayers collectively and to participate in various forms of social functions. Visitors arriving at home are usually entertained in the outer compound or in the part of the street facing the compound. The open spaces are less used (for reasons discussed earlier in this study).

Adult children have a wider range of social activities in the evening. Their area of contact extends almost to the whole neighbourhood; for instance, some are members in the football team which carries the name of the neighbourhood, and quite a few reported of frequent visits to the social club. Young children spend their evenings studying or playing in the inner compound or playing with other children in the open spaces around the houses.

Analysis of evening functions suggests the provision of two types of private open spaces; one to be reserved for adult women and young children and the other for reception of guests. At the same time, it will be necessary to provide semi-private open spaces (possibly shared by different families) where adults can gather in the evenings, children can play and ceremonies involving larger numbers of people can take place (figure 32).

(v) NIGHT FUNCTIONS

Adult males are usually back home some time between 8 and 9 p.m. to have their supper and to join the rest of the family for one or two hours before it is bed time. Supper is usually served in an informal manner around 9 p.m. and in several instances the husband, wife and their children had their meal together.

Bed time is usually between 10 and 11 p.m. Young children sleep with their parents in the inner compound and adult male children in the outer or 'guests compound'. Separate arrangements have sometimes been made for grown up daughters by screening part of the compound. It has been shown earlier that about two-thirds of heads of households found this sleeping arrangement satisfactory; the problem, however, arises when there are guests staying overnight; in which case only 40% found the present arrangements to provide sufficient privacy between sexes.

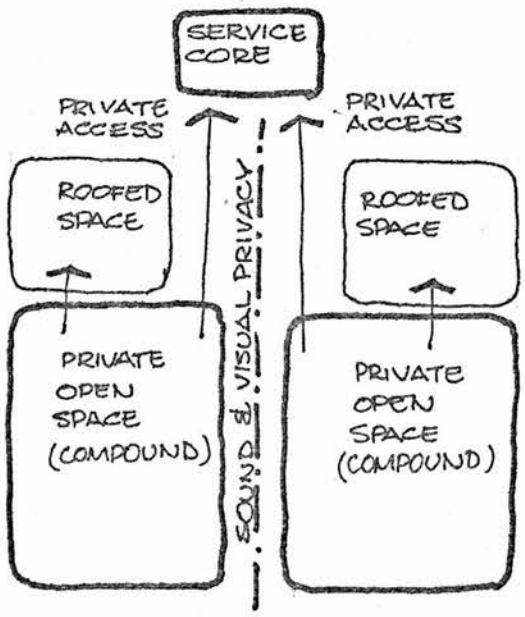
In view of the facts that most households in the sample have complex structures, and that most of them often receive

figure 32:

ANALYSIS OF EVENING FUNCTIONS

DETAILS OF FUNCTIONS		REQUREMENTS OF FUNCTIONS
Time	5.00p.m. to 8.00p.m.	1) There should be at least two separate compounds for family out-door living functions.
People present	Adult women, young children and occasionally adult men and guests.	2) The two compounds should be visually separated so as to insure sufficient privacy for women folk when there are male visitors in the house.
Climatic conditions	Comfortably cold in the open spaces. Rooms are relatively hot as roofs and walls transmit the heat gained during the day.	3) Each compound should have a private access to the external entrance and to such facilities as W.C, bathroom and zeer house.
Activities performed	Mostly social functions such as entertainment of guests, communal meetings and family meetings.	4) The external entrance to the house should be placed in such a way as to secure the privacy of women folk against passers-by and male visitors entering the house,
Places	The compounds and the open spaces around them.	5) At least one of these compounds (preferably the outer one) should provide sufficient space for the reception of a reasonable number of guests (in minor occasions) and for such things as gardening and cultivation.
		6) The other compound should provide sufficient space for family meetings and young children playing. There should be sufficient area to add (where necessary) a place for keeping goats and other domestic animals.
		7) Each compound should be easily accessible from a roofed space where furniture can be stored during the day.
		8) There should be easy access to a semi private or a communal space for family major occasions, children playing and communal functions.

LAYOUT AND SPACE REQUIREMENTS



MINIMUM SPACE REQUIREMENTS

TOTAL	ROOFED	UNROOFED
140 SQ.M	-	140 SQ.M.

guests to stay for one or two nights,[1] it will be desirable to provide more separate courtyards than at present in order to ensure sufficient privacy between sexes in outdoor sleeping.

Indoor sleeping is not uncommon; during the rainy season and in the cold winter months the whole family sleeps indoors and there should be adequate provision for different sexes and sufficient protection against cold winds.

Figure 33 describes night functions and analyses their space and general design requirements.

(vi) OTHER FUNCTIONS

Some of the house functions recognize no specific time and there should be adequate provision for them throughout all hours of the day. The house should provide a W.C., ablution and bathroom located in such a way as to ensure sufficient privacy for their users. There should also be a place for the storage of household possessions and valuables. Where domestic animals are kept, there should be a place for keeping them away from the family living quarters.

6.4 DESIGN IMPLICATIONS[2]

The above analysis suggests that the minimum family house should provide:-

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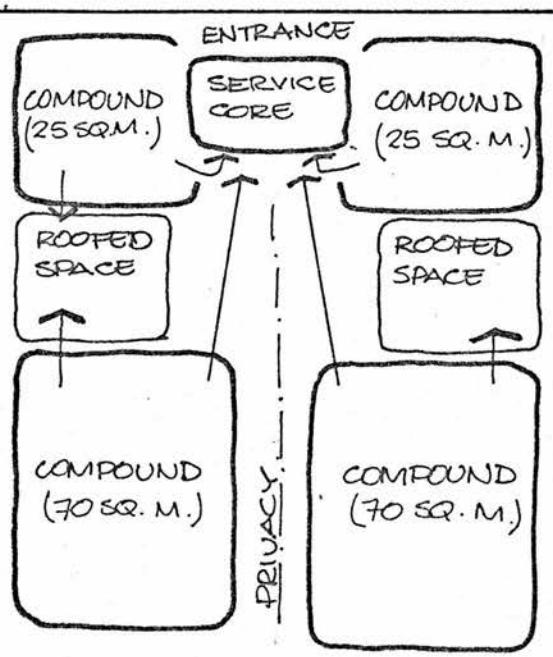
1. About 35% of families said they receive guests to stay overnight at least once a week, 38% said at least once a month and 12% said at least once every six months. Only 13% said they hardly ever receive guests to stay overnight; Table 8b, Appendix 5. These figures are probably exaggerated, but the point they emphasize is nevertheless worth consideration.
2. The sizes of rooms and spaces given throughout this section have been worked out from a critical appraisal of a number of plan types and furniture arrangements in the light of the evidence received (see below; section 6.5).

figure 33:

ANALYSIS OF NIGHT FUNCTIONS

DETAILS OF FUNCTIONS		REQUREMENTS OF FUNCTIONS
Time	8.00p.m. to 7.00a.m.	1) There should be at least two separate compounds for family outdoor sleeping.
People present	All members of the household.	2) It should be possible to subdivide these compounds, when need may arise without sacrificing privacy between sexes (eg by making men's compounds only accessible through women's compounds or vice versa).
Climatic conditions	Comfortably mild in summer cold in winter.	3) Each compound should have a direct access into a roofed space which can be sheltered against rain and cold.
Activities performed	Having a meal and having a chat or listening to radio in the early hours of the night and sleeping (around 10 to 11p.m)	4) Each compound should have access to W.C. and other facilities without the need to pass through compounds occupied by parents or members of the opposite sex.
Places	The compounds in summer and rooms in winter.	

LAYOUT AND SPACE REQUIREMENTS



MINIMUM SPACE REQUIREMENTS

TOTAL	ROOFED	UNROOFED
4 COMPOUNDS	—	190 SQ. M.

(i) HABITABLE ROOFED SPACES:[1]

These should be designed to accommodate most family living functions during the day allowing for sufficient light and ventilation and providing adequate means to cut out direct sun rays, glare, rain and dust. The spaces must be shaped, and doors and windows placed so as to allow convenient arrangements for various activities and types of furniture.

The present practice is to provide two types of habitable roofed spaces; rooms and verandahs. Available evidence suggests that neither the present room nor the present verandahs are completely adequate; the room is too closed to be comfortable and the verandah too open. A type of space approaching the traditional sala (described earlier), but with more space and better control against the elements, can perhaps provide a better answer. Whilst maintaining the advantages of both the room and the verandah, it can (if carefully designed), be more economical in terms of area and total cost;[2] (figure 34).

The size of the habitable roofed space should be decided according to family size. The requirements of different types of families will be discussed in more detail later, but

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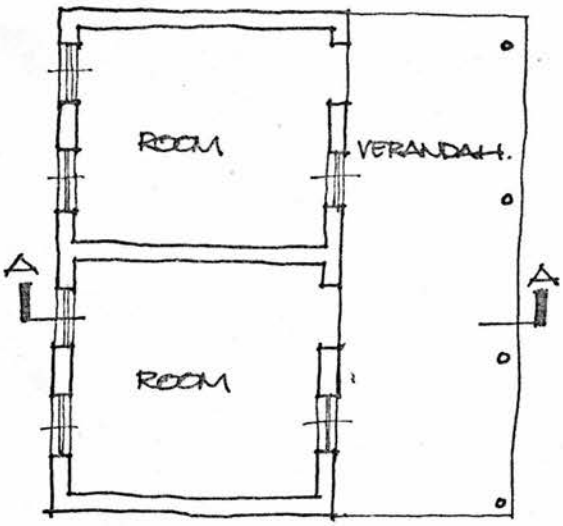
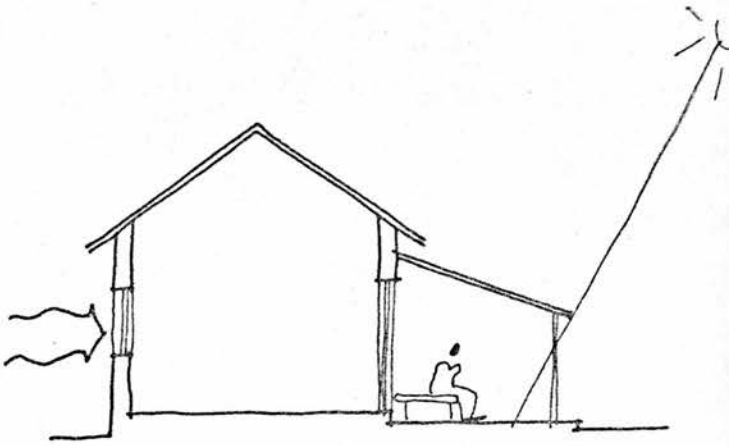
1. This is usually known as 'living floor space'. However to distinguish between roofed and open space and to emphasize the 'sheltering' side of habitable spaces, the author prefers to use the terms 'habitable roofed spaces'.

2. Fry and Drew wrote about rooms and verandahs in the tropical house as follows:-
'The old idea was to build a wide verandah on all sides and be certain that neither sun heat, glare or rain could penetrate the living-rooms. This succeeded, but led to such gloomy interiors that the occupants usually preferred to live on the wide verandahs, thus defeating the intentions of the designer. The idea of the verandah is sensible but its design needs more study'. See:-
MAXWELL FRY and JANE DREW "Tropical Architecture in the Dry and Humid Zones;" Batsford, London, 1964, p. 54.

figure 34:
THE HABITABLE ROOFED SPACES



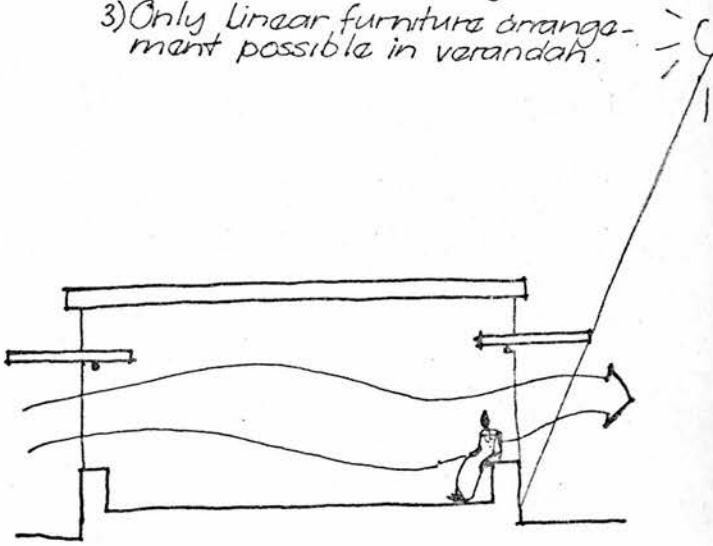
PLAN OF 'ROOM-VERANDAH' COMPLEX.



SECTION AA

1) No through ventilation
2) Large part of verandah area exposed to sun and glare
3) Only linear furniture arrangement possible in verandah.

PLAN



SECTION BB

1) Through ventilation.
2) Protection from glare and sunrays.
3) More flexibility in arrangement of furniture.
4) More economical in terms of space.

analysis of various plan types and arrangements suggests that the rate of habitable roofed space should not be below 4·00 sq. m. per person. For a family of five persons, this gives a minimum habitable roofed space equal to 20·00 sq. m. This can be arranged in the form of one living space, but another living space can be provided jointly with the space for cooking (see below).

(ii) COOKING SPACE

The evidence available to this study suggests that the size and the position of cooking space in the house is needing reconsideration. Traditionally, the 'kitchen' was detached from the living part of the house because of the type of fuel used, the attitude to the person doing the cooking and also because the kitchen itself was shared with other families.[1] With changing circumstances; increasing shortage of firewood, availability of improved fuels such as stoves and bottled gas,[2] a more liberal outlook to wife and family and an increasingly independent family life reflected in the demand for a self contained house, there is need for a fresh view to the design of the kitchen.

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1. Similar observations have been made by David Oakley in his study of 'Tropical Houses'; see:
DAVID OAKLEY; "Tropical Houses: A Guide to their Design." Batsford, London, 1961, pp. 240 - 243. See also;
COLONIAL BUILDING NOTES, No. 45. "Cooking and Fuel Economy in Low-Cost Tropical Housing." Building Research Station, Watford, June, 1957.

2. At present, only less than 5% of families in the projects surveyed use boutagas for cooking. Improved stoves and bottled gas are at present more popular among houses occupied by families with higher and middle incomes and it is quite likely that they will soon be commonplace in houses occupied by low income groups.

The present study has shown that cooking – as well as many other household tasks – is performed integrally with the women's leisure pursuits and will need to be provided for with the women's living space.

On all the above considerations, it is recommended that at least another 12·00 sq. m. of habitable roofed space should be provided for cooking and related functions.

(iii) STORAGE SPACES

Three kinds of storage arrangements are needed in the family house:-

1. Storage of food before and after cooking; preferably in a fly-proof cupboard.
2. Storage of clothes; in a dry, well ventilated, clean and insect-proof space. This can be a wardrobe, a rack or just clothes-hangers.
3. Storage of other household possessions such as bags, old furniture, garden equipment, etc. These can be provided for in a separate room well ventilated and lit.

Storage of clothes and storage of food can take place within the living and cooking spaces described above and there seems to be no need for separate provision. However, a minimum storage space of 4·00 sq. m. should be allowed per house for such things as old furniture, bags and the like to reduce the pressure on habitable spaces. It must also be remembered that a considerable number of housewives like to display (rather than store) such things as glasses, cups,

pans, etc. (see Plate 23); the living space in the home should therefore be designed to accommodate a display table or a cupboard in addition to the usual furniture of beds and chairs, etc.

(iv) W.C., WASH-TUB, BATHROOM AND ZEER-HOUSE

These can be grouped together (probably in a standard unit) and located inside the plot in such a way as to make them privately accessible from different compounds in the house. This service core unit should be possible within a total area of 9·00 sq. m.

The present acqua-privy developed by the National Housing Authority, provides a substantial improvement over the earlier bucket latrine from both social and hygienic points of view and was met with plenty of approval from the tenants. It should therefore be made available to all future tenants — at least as a temporary measure pending the installation of full water-borne sanitation.

At present, many families keep drinking water jars inside rooms and verandahs and this has caused plenty of damage to room walls and has also resulted in muddy and damp room interiors (see Plate 11). It will be necessary to provide a separate zeer-house well ventilated and centrally placed to facilitate its use from different parts of the house.

(v) PRIVATE OPEN SPACES INSIDE THE PLOT

The house should provide at least two separate open spaces (or compounds) for use by family members and guests.

For certain types of families (e.g. sharing families and families with adult male and female children), there should be more than two separate compounds to facilitate privacy in out-door sleeping.

All compounds should be sanitary and should have access to facilities for water supply, waste water and refuse disposal. Access from each compound to such facilities as W.C., bathroom and zeer-house should be possible without the need for members of one sex to be exposed to guests of the opposite sex. Access from one compound to the other is essential (for food delivery, cleaning, supervision etc.) but a certain degree of visual privacy must be maintained within each compound. This should be possible without the need to add screens or dividing walls. Compounds should also be protected from inlooking by neighbours, passers-by or unexpected visitors. A number of complaints have been made by the tenants about the present height of external walls (1·80 m.) being insufficient to prevent inlooking; in future schemes this should be raised to not less than 2·00 m.

As most family activities in the mornings and evenings are performed in the compound spaces, it should be possible to move portable items of furniture and equipment between the rooms and the compound without too much physical effort. This suggests that each compound should have direct access to a nearby roofed space where furniture can be moved easily when it is hot outside or when there is rain or dust storm.

We have emphasised (in Volume I of this study) the need to formulate minimum standards for the open space inside the

plot. Apart from family size, this should take consideration of many factors such as:

1. family life-cycle and the need to provide separate sleeping spaces for different age/sex groups;
2. the provision for such space demanding outdoor activities as laundry-drying, gardening, family meetings, children playing and family celebrations such as weddings;
3. the possibility of future expansion, e.g. by adding a room for children or a room-complex for a branch family.

On the other hand, consideration should also be taken of implications of plot size on density, land and costs. Provision for family ceremonies calls for extremely large compounds (which can be considered too extravagant for usual family living). The present practice of families suggests that if the open spaces around groups of houses are carefully planned, they can be used for such space demanding functions. Nevertheless, the plot should provide sufficient space for the reception of a reasonable number of guests in smaller occasions. At least two of the compounds (one in the men's side and the other in the women's side) should each be of a total area not less than 70·00 sq. m. Besides providing for various types of social functions these areas will be adequate to provide for clothes-drying, children playing, gardening and can make possible future expansion within the plot.

Families of larger sizes or complex structures demand more than two compounds, to provide for sufficient privacy

between sexes, but these extra compounds need not be as large; a total area of 25·00 sq. m. per extra compound should be sufficient to provide a separate out-door sleeping space; (for more details see Table 10 below).

(vi) OPEN SPACES AROUND THE COMPOUND

Discussions on the provision of space in the home cannot be complete without considering the space around the home. This is particularly important in this case where both the street and the open space around the small group of houses are considered by the tenants as parts of the dwelling accommodation and are therefore used for various household functions.

The semi-private open spaces around houses should be big enough to accommodate various types of communal activities and yet small enough to be within a serviceable and controlable scale. Extensive research is needing to be done before any thresholds can be established, but the experience of the New Deims suggests that for the residential community of about ten houses anything between 300 sq. m. and 600 sq. m. can be useful. The question, however, is not only one of size but also one of quality. The open space must link the houses at its sides rather than separate them; it must be safe for children to play, pleasant for adults to meet in the evenings of ramadan (fasting month) and private for weddings and funerals. Simple landscaping can do a lot to improve the quality of open spaces but this raises questions of supervision, and maintenance which should be settled.

Some of the responsibility can be placed with the tenants, but supervision and maintenance by the authority will be inevitable.

Apart from the semi private open spaces associated with the small groups of houses, there should be a hierarchy of open spaces within the residential neighbourhood varying in size and location according to the functions they are designed to serve. These vary from the small spaces between communities for such purposes as garbage collection, bus stops and local bazaars to the relatively larger spaces within the neighbourhood for marketing, playgrounds and civic centres.[1]

6.5 PHILOSOPHY IN THE PROVISION OF SPACE

The philosophy adopted in the provision of space has been explained integrally with our discussions of the design implications of functions (section 6.4 above). However, it will be noticed that we have distinguished between different types of spaces to be provided in the family home; the sizes of these spaces are determined according to various criteria. For example, the size of the habitable roofed space is

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1. Chermayeff and Alexander divide the urban hierarchy of spaces into six domains: urban-public (highways, roads, paths, civil parks); urban-semi-public (city halls, parking lots, garages, service stations, stadia); group-public (garbage collection, utilities control, access to fire-fighting); family-private (spaces controlled by a single family devoted to communal family activities such as eating, entertainment, hygiene); individual-private (the room of one's own).
CHERMAYEFF, S; and ALEXANDER, C; "Community and Privacy." Doubleday, New York, 1963, pp. 121 - 122.

determined in relation to size of family and type of functions performed. On the other hand, the size of the plot is determined according to the amount of roofed space required by the family, the requirements of future expansion, separation of sexes in sleeping arrangements, family celebrations and so on. The figures given in each case have been worked out from a detailed analysis of a number of conventional and modern plans in the light of our studies on user's reactions and patterns of use of dwelling space.

6.6 SUMMARY OF MINIMUM SPACE STANDARDS

Throughout this study we have emphasized the importance of open space (both private and semi private) in the daily life of the Sudanese family. It is believed that the formulation of space standards for Sudanese housing – and indeed tropical housing – should be based not only on floor space (or roofed space) requirements, but also on standards of open space.[1] On this understanding, Table 10 below gives a summary of minimum space requirements in the Sudanese low income family house according to different family sizes. Two points, however, remain to be stressed:-

FIRSTLY: Standards for the space inside the home must be co-ordinated with standards for the space outside the home in order to ensure that the economy achieved in one area is not lost in another. This co-ordination is necessary, not only in terms

1. For more details see Volume I.

of figures relating to space standards and density, but also in terms of general approach and design philosophy as to achieve a well balanced and liveable environment.[1]

SECONDLY: The figures given in the table represent what is believed to be the socially and functionally acceptable minima; they are not necessarily what is socially desirable or economically feasible. As such they are intended to provide guide lines for the formulation of 'optimum standards' to meet the requirements of different families, at different life cycles, with different incomes and priorities according to certain government policies.

The next chapter distinguishes between the requirements of different types of families and illustrates the procedure to be followed for arriving at optimum standards.

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1. It is rather fortunate that the last few months have witnessed the establishment of a separate ministry for housing in the Sudan. This no doubt provides a good chance for bringing together various administrative, planning and design departments which have till recently been almost completely isolated. One can therefore hope for a more co-ordinated approach not only to the problem of space and housing standards but also to all other aspects of mass housing.

TABLE 10

SUMMARY OF MINIMUM SPACE STANDARDS

Family size	Total Plot Size (in sq. m.)	Details			
		Habitable* roofed space (1)	Service≠ Core + Storage (2)	Open# Space in the plot (i.e. compounds) (3)	Plot coverage = $\frac{(1)+(2)}{\text{Total Plot size}} \times 100$
2	180	24	12	140	20%
3		24	12	140	20%
4	200	28	14	140	21%
5		32	14	140	23%
6		36	14	140	25%
7	225	40	14	165	24%
8		44	16	165	27%
9	260	48	16	190	24%
10		52	16	190	25%
11		56	16	190	27%
12	300	60	16	215	25%
Over 12		60	16	215	25%

* To be provided in at least two separate spaces one of which could be used for cooking.

≠ Includes provision for one or two W.C.'s opening into different compounds, a bathroom, a wash tub, and a place for keeping drinking water jars.

#To be provided in at least two separate compounds.

CHAPTER 7: THE REQUIREMENTS OF DIFFERENT FAMILIES

7.1 INTRODUCTION

The minimum standards described in the previous section have been based on the social and functional requirements of the 'average' Sudanese family. As there is no such average family, these standards represent a rough compromise between needs of various types of families at different stages of development with different levels of economic ability and probably different orders of priority. To bring these standards closer to the requirements of people therefore, a lot more needs to be known about how far different families 'deviate from the average'. How, for example, does the demand for space vary among different economic groups and what is the importance attached to 'more space' at different phases of the family growth and development?[1]

This section looks more closely to the housing problems posed by different types of families. It analyses — in the light of the evidence that was available — the housing

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1. The comments made by Mrs. Aby Lughud about the American family requirements seem to be of universal relevance:-

"There is no standard housing consumer like every other in all respects and therefore demanding the same characteristics in his dwelling. Housing needs and solutions vary from family to family and even within the same family as its size and income fluctuate."

"At different stages in the family growth and development, some needs will seem more compelling than others. Space may be sacrificed for beauty when the family is small; low cost, home ownership, fashionable location or other dwelling specifications assume dominant positions at different periods of the family existence."

See "HOUSING CHOICES..." ibid., p. 95.

requirements of different family groups and it discusses these requirements within the context of housing standards, financial policies, and building programmes. By so doing, this section aims to provide some guide lines for the interpretation of the recommended minimum standards so as to suit different family types and economic classes.

7.2 ECONOMIC CLASS AND THE DEMAND FOR SPACE

To begin with, this study has found no significant relation between the family economic class and the desire expressed for more space. Different families seem to ask for more space irrespective of their income levels and economic abilities.[1] For example, Tables 11 and 12 below, taken from Khartoum North study, indicate that there is hardly any degree of correlation between the tenant's income levels and the opinions expressed about the size of the plot or the number of rooms in the house.

The significance of family income however, appears mostly at the time of buying the house, but once the house is bought, other factors assume greater importance in determining the family satisfaction with housing (e.g. the size of the space available for the family and the degree

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1. This seems to support the view held by Nelson Foote that it is only among those families who have achieved a certain level of economic ability that the psychological resistance to higher allocations operates. In our sample, it can be thecrized that the gap between income and cost of a socially acceptable house is so wide that people take little consideration of their economic ability when expressing the desire for more space. See "HOUSING CHOICES..." ibid. (preface).

TABLE 11

FAMILY INCOME GROUP AND SATISFACTION WITH PLOT SIZE

Family Income (In Sudanese Pounds per Month)	Sample	Number Satisfied with Plot Size	Percentage Satisfied %
Under 10	10	6	60
10 - 15	64	27	42
16 - 20	120	42	35
21 - 25	92	47	50
26 - 30	54	22	40
31 - 35	30	15	50
Over 35	40	32	80
TOTAL	410	191	46%

TABLE 12

FAMILY INCOME GROUP AND SATISFACTION WITH NUMBER OF ROOMS IN THE HOUSE

Family Income (In Sudanese pounds per Month)	Sample	Number Satisfied with rooms	Percentage Satisfied %
Under 10	10	4	40
10 - 15	64	17	26
16 - 20	120	36	30
21 - 25	92	40	43
26 - 30	54	31	57
31 - 35	30	15	50
Over 35	40	13	53
TOTAL	410	156	38%

of privacy available for the family groups).[1]

(i) ECONOMIC GROUPS

In relation to the cost of the house built to the recommended minimum standards, urban families can be grouped as follows:-

A. Those who can build their own houses.

B. Those who can afford to build their houses but who require a form of credit.

C. Those who do not earn enough to pay for the cost of the minimum house.[2]

To estimate the proportion of each group among the urban families, certain assumptions must be made regarding such things as the standards of construction and material (and the corresponding costs), and the percentage of the family income that should be allocated for housing (i.e. for rent or mortgage). The following estimates of the sizes of economic groups are based on the assumptions that:-

1. the standards of construction, material and servicing presently adopted in government hire-purchase schemes are to be maintained;[3]

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1. This seems to agree with the view of Vere Hole that "what sells a house are not necessarily those features which will prove most appreciated when the house is occupied." See, HOLE, V, "User Needs and the Design of Houses: The Current and Potential Contribution of Sociological Studies." CIB. Conference, Stockholm, Oct. 1967.

2. These are roughly the economic groupings recommended by the United Nations Technical Mission to the Gold Coast. See, UNITED NATIONS, 'Housing in Ghana' New York, 1957 pp. 52 - 58.

3. The conclusion will be arrived at later, that for certain types of families these standards have to be compromised.

2. not more than 20% of the family income should be allocated for rent;[1]
3. in the case of credits being made available, the period of repayment should be between 12 and 20 years (i.e. similar to the present practice in government projects).

(ii) THE SIZE OF ECONOMIC GROUPS

According to the first assumption above, figure 35 was drawn to show the variation of total cost with the variation of total dwelling roofed space.[2] It can be seen from the figure that the cost of the house built to the recommended minimum space standards varies from about 550 Sudanese pounds for a two or three persons house, to about 750 Sudanese pounds for a house of a family of ten persons or more.

Applying the second and third assumptions above, it was found that only those families with monthly incomes over 22 Sudanese pounds per month will be able to afford the cost of a house.

The table below, summarized from the Department of Statistics Population and Housing Surveys 1964/65, gives the distribution of households in six major towns of central Sudan according to monthly income. It will be seen from the table that about 52% of households have incomes above

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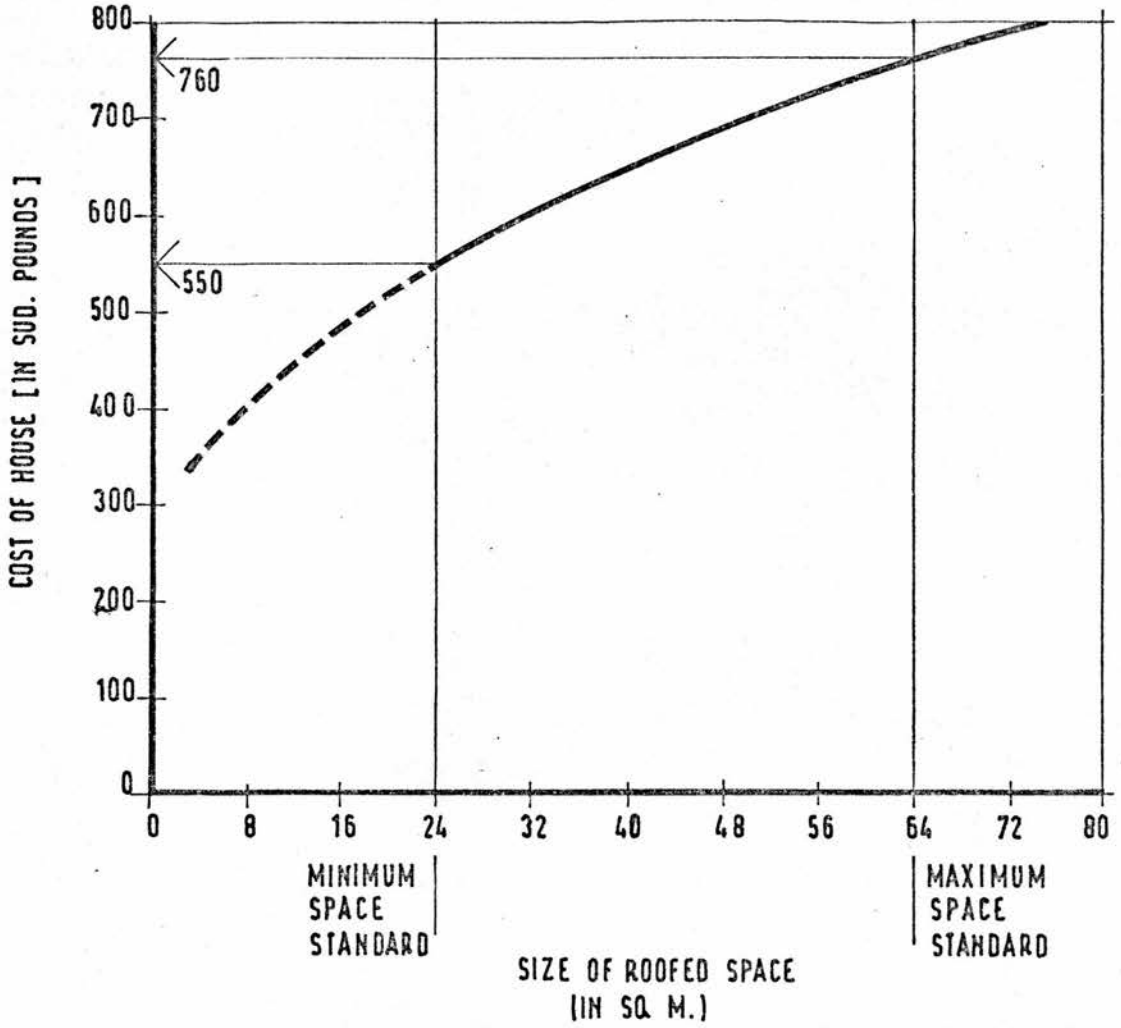
1. The term 'rent' is used in this context irrespective of whether the house is to be rented or owned. In the latter case, the market rent value of the house is considered.
2. The cost of house was taken to include the cost of land but to exclude essential charges and departmental fees.

figure 35:

VARIATION OF TOTAL COST OF BUILDING ACCORDING TO STANDARDS OF ROOFED SPACE

(Based on standards of construction similar to those in Khartoum North)



22 Sudanese pounds per month and can, therefore, be assumed to be able to afford the cost of the house. They can be further subdivided into two groups: those who can afford to build without the need for government credits (i.e. group A above), and those who can afford to do so but will need a form of credit (i.e. group B above). The line between the two groups is in fact too thin and government policies can do a lot to determine the size of each group, but the present study suggests that those with incomes in the range (23-30) Sudanese pounds per month can best be catered for by providing credits.[1] From Table 13 below, it can be estimated that roughly 15% of urban households require a form of credit to be able to build their houses.

TABLE 13

DISTRIBUTION OF HOUSEHOLDS IN 6 MAJOR TOWNS OF CENTRAL SUDAN ACCORDING TO MONTHLY INCOME

Income Group (Sudanese pounds per month)	Centre	Percentage of Households
Below 7	-	6%
8 - 12	10	15%
13 - 17	15	15%
18 - 22	20	12%
23 - 27	25	9%
28 - 32	30	7%
33 - 37	35	5%
38 - 42	40	4%
Above 42	-	27%

SOURCE: DEPT. OF STATISTICS 'Population and Housing Surveys 1964/65' (Summarized).

1. Families with incomes below 30 Sudanese pounds per month will not be found attractive by the private sector. See, Volume one, Chapter 1, Section dealing with Housing Finance.

To summarise briefly the above analysis: urban households can be grouped as follows:-

Group A = 37%;

Group B = 15%;

and Group C = 48%.

Before we go on to consider the standards and policies suitable for each group, it must be emphasized that the above are only rough estimates based on the present building standards and building costs. If, for example, the standards of building materials and building methods presently required in third class areas are relaxed in favour of more modest ones — to match the economy of some households — the percentage of those who can afford to pay for their housing will be considerably increased. Figure 36 shows for different standards of construction the percentage of households in urban areas who will be able to afford to build a house to the recommended minimum space standards.

(iii) THE REQUIREMENTS OF DIFFERENT ECONOMIC GROUPS

GROUP A (Families who can afford to build their own houses).

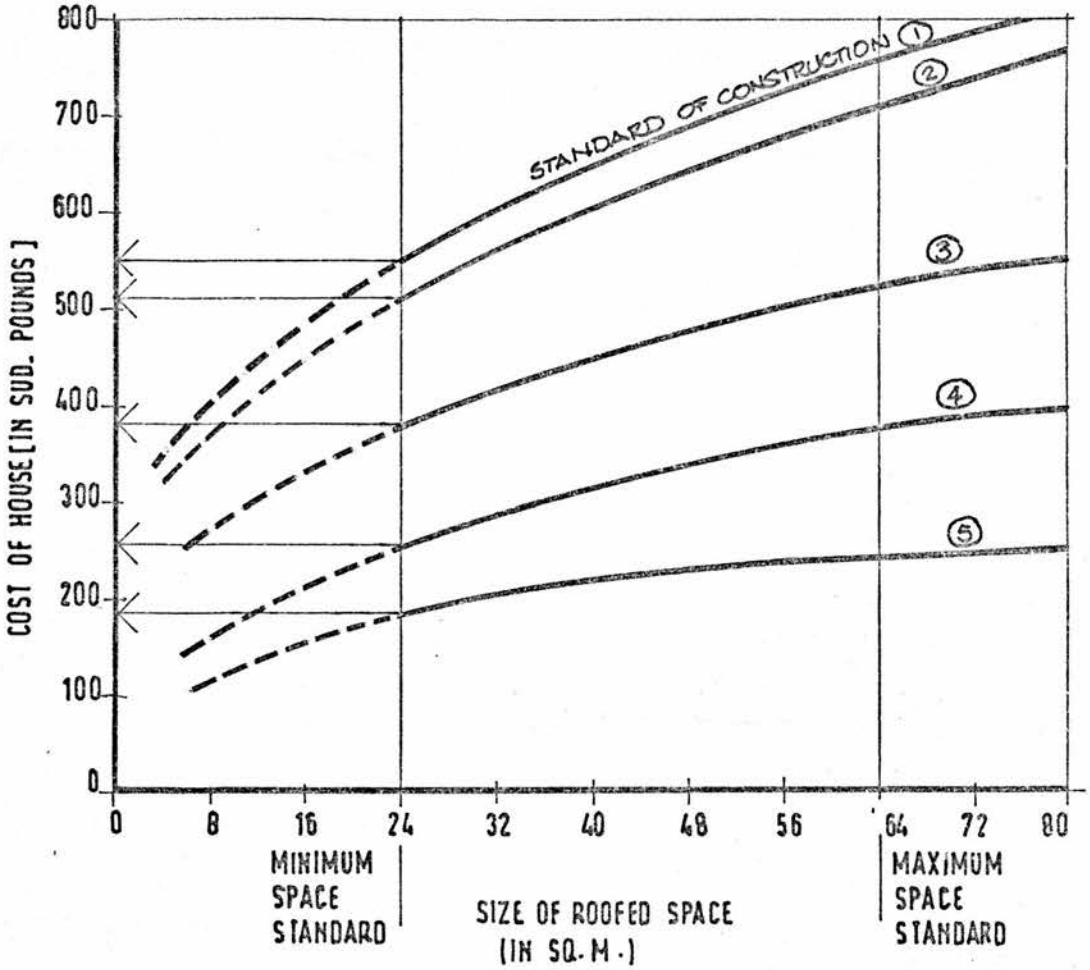
It is perfectly easy to assume that because certain households can afford to build their own houses, all government efforts should be limited to those who cannot. The United Nations Mission to the Gold Coast warns against this type of policy as it may encourage households with higher incomes to compete for the accommodation intended for the low income families.[1] Our own experience in the Sudan has

1. UNITED NATIONS, 'Housing in Ghana' ibid., p. 53.

figure 36:

PERCENTAGE OF HOUSEHOLDS WHO CAN AFFORD THE COST OF THE RECOMMENDED SPACE STANDARDS AT DIFFERENT STANDARDS OF CONSTRUCTION

(Based on information on cost estimates supplied by Sayed B. A. El Tom quantity suveyor Ministry of Works, Khartoum, 1967.)



Standard of construction	Description	Percentage of families who can afford the minimum standard
①	Hollow blocks.	52 %
②	Red bricks on cement mortar (one brick).	55 %
③	Improved mud bricks.	75 %
④	Mud bricks.	85 %
⑤	Mud layer	92 %

shown that the projects intended for low income groups have attracted other groups with relatively higher incomes.

To consider, in detail, the housing requirements of this group is beyond the scope of the present study, but there should be planned building sites, a healthy construction industry and private lending societies. With regard to housing standards, there should be a certain degree of choice between say, an improved standard of construction and servicing or a higher standard of space, but — in the interests of urban density and urban land requirements — there seems to be a good point for specifying maximum space standards. The present plot sizes in first class areas range from 800 to 1,200 sq. m.[1] and this has meant development at very low densities (2 to 3 houses per acre). Development at such low densities has resulted in excessive horizontal expansion of towns and has pushed the housing areas of the low income families away from places of employment in the town centre. It has also created plenty of other problems of urban economics, urban facilities and services and urban transports.

GROUP B (Families who can afford to build their houses but who require a form of credit)

To encourage home ownership, a form of credit must be made available for certain families. It has already been pointed out that the credits to be made available must be based not only on the present family income, but also on

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1. Compared to 300 sq. m. in the third class areas (built for low income families). It is interesting to note that the average family size in the 3rd class areas is roughly two persons higher than in the first class areas.

future income prospects and that there should be a reasonable balance between the family income and the repayments of credits.[1] There is however, always the danger that if government terms were made too attractive (in relation to other private arrangements) there will be plenty of competition for government schemes and the credits advanced can be used for making profits instead of solving the housing problems of families.[2] Government credits must go for those who genuinely feel the need for building a house for their own use and who do not have sufficient savings to do so. The credits given must therefore be supervised to ensure that they are employed for the intended purpose.

The few resources raised for housing, on the other hand, must not be completely exhausted on the housing of the higher and middle income groups in a time when there are many families who cannot afford the cost of even the minimum house. The aim – as the Royal Commission to East Africa puts it – should be 'to raise the level of ALL housing by using all available resources.'[3] This implies specifying maximum limits for the credits to be given decided according to the tenant's income and number of dependents.

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1. For further discussion see Chapter 3 above.
2. It has already been stated that not less than one quarter of the houses in each government project are presently being sublet; sometimes at monthly rents more than double the amount paid to the government in the form of mortgage or rent.
3. REPORT OF THE ROYAL COMMISSION TO EAST AFRICA. Summary of section on Housing. Ibid.

GROUP C (Families who do not earn enough to pay for the cost of a house)

This group can be further subdivided into a number of economic and social subgroups. The young growing family with too little income at present to pay for the cost of a house but with good income prospects, and the squatter family with no permanent source of income and with little future prospects, both belong to this group; but each presents its own problems and each calls for its own solutions. For the one, building the house in anticipation of the future may provide the best answer; for the other, a form of subsidy in cash or kind or a self aided approach may provide a better answer; for both, the present standards of construction and material required in the third class housing areas may need to be relaxed.

The study of the housing requirements of this group calls for a detailed analysis of the changes which take place in the family needs and resources at different stages of its development cycle. This will be attempted below; it will, however, be shown that the majority of families in this group can best be served by providing serviced plots of land (with probably a standardized core unit), and otherwise allowing the minimum roofed space standards to be gradually achieved as the family resources improve. For a few families, (those with very low and uncertain incomes) a form of subsidy in cash or kind will need to be given relative to the family size and income.

7.3 STAGE IN LIFE CYCLE AND FAMILY HOUSING REQUIREMENTS

From our study of the social structure of the household (Chapter 2 above), it can be theorized that there are four main phases of the family development which exert different pressures on its housing requirements:-

1. The pre-child phase: starting immediately after marriage and continuing for one or two years before the first child is born;
2. The growing-family phase: during which the family is gradually growing as more children are born;
3. The grown up (or adult-family) phase: in which the family has reached its ultimate growth and no more children are born; and;
4. The household phase: in which the family enters into its household cycle (see below).

Although these phases of family development often overlap, it can be possible to identify different housing problems which dominate each phase.

(i) THE PRE-CHILD PHASE

For the average European family, the demand for a separate house may emerge immediately after marriage or even before then. For the average low income Sudanese family, this demand is delayed several years; in some cases it is delayed till the first two or three children are born; in a few cases, it never emerges because the young family continues sharing the parents' house till it eventually takes over.

In the years immediately after marriage, the young couple are left with too little reserves to think of buying

a separate house. Most of the husband's savings before marriage are usually absorbed by the wedding ceremonies. Moreover, as his income is little, it is difficult to find credits sufficient for building a house. There are therefore two possible alternatives: either to rent a house or part of a house and establish a separate household, or else, to share with parents or in-laws. The last alternative is usually found more attractive because it offers a chance for escaping the high rents and also because of many other social advantages. The idea of establishing a separate household is therefore finally sacrificed in favour of a more economically and socially secure life with parents. However, this is only accepted as a temporary measure because the husband is promised an increase in income as he develops further experience in his job. For his young wife this compromise is usually acceptable as it means living amongst acquaintances and also an extra hand with household duties particularly in the months when she is expecting her first child.

The young family space requirements are few. They can be met by allocating a separate room (preferably with a verandah) in the parents' house to secure privacy and a certain degree of independence. For its other living functions, the young family performs as an integral part of the parent household. Available facilities are shared, cooking is performed jointly, meals are taken together and household expenditure is shared cooperatively.

The need for space becomes more pronounced when

children are born. It is usually after the young family has its second or third child that finding a separate house becomes a problem.

(ii) THE GROWING FAMILY PHASE

With changing circumstances; an increase in income and a growing number of children, the need for a separate house starts to present itself. However, the relatively low income still severely limits the choices that can be made. Buying a house in the government hire-purchase schemes, even when this is possible,[1] implies a high initial down payment. Moreover, as the period of repayment is usually short (between 12 and 20 years) it implies a major part of monthly income allocated for mortgage.[2] Renting a house in the private market demands even higher monthly allocations and can make it impossible to save for buying a house in the future. The third, and apparently most attractive alternative, lies in finding a piece of land where the family can at least find the security of tenure for a start and can go on to add and improve as its economic ability

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1. Government hire purchase schemes are not available for every one in need. For example, estimates of housing needs in Urban Areas around 1965 were over 30,000 dwelling units; only 1,000 dwelling units were made available for hire purchase during the 6 year period between 1961 and 1967 (i.e. about 3% of the total need).

2. See Chapter 3 above pp.

improves.[1] Although this too involves an initial outlay (for cost of land, boundary walls and basic shelter), the freedom to build one's own house usually outweighs this difficulty.

During this stage of the family development, the need is for the type of house which can be appropriate for the rest of family existence. Space as measured by plot size is therefore more important than other features such as number of rooms, material of building and improved servicing. Having secured the ownership of a reasonably sized plot of land, these additions and improvements can be made later.[2] This solution therefore implies home ownership and the freedom it offers for adding and changing.

The greatest part of the present housing needs in urban areas of central Sudan appears to be formed by families belonging to this stage of their development (i.e. growing

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1. Slightly less than half the tenants in Khartoum North project said they would have preferred plots of land instead of their present houses. The most important reason given was that the house demands large portions of their incomes for mortgages while the plot of land offers an opportunity for a more reasonable balance between needs and resources. This view is probably exaggerated, particularly as none of the tenants had experienced the difficulties involved in the plot of land, but the point is nevertheless clear that the preference to the plot of land was mostly a reaction to the high mortgages demanded by the house. It is interesting to note that in the Deims Project where mortgages are relatively lower than in Khartoum North more than 80% of the tenants preferred their present houses to the plots of land.

2. In Khartoum Extensions, the tenants had been allocated plots of land and allowed to build for themselves. It was found that practically every house was built in more than one phase. At the time of the interviews, (5 years after the houses had been allocated), 98% of the tenants have added a first room, 96% have added a W.C., 90% have added a second room, 89% have added a kitchen, 68% have added a bathroom and 49% have added verandahs.

families with a few children).[1] These are mainly families who have recently come to towns and overspill from existing households in the towns.[2] Amongst these, there are few families with incomes high enough to pay for the cost of a house in the private market or in the government hire-purchase schemes; but the great majority can best be served by granting titles to plots of land sized and shaped in response to future requirements. A service core or a 'seed-shelter' can be provided, but efforts should be directed to reduce the credit burden on the house owner by encouraging him to build his own house gradually as his needs and resources change. Government advice should also be given to direct future expansion (e.g. by distribution of model plan types or building model houses).

(iii) THE GROWN UP OR ADULT-FAMILY PHASE

As children are growing up, the need for privacy between sexes brings about the demand for more rooms and courtyards. If there is sufficient space in the plot, these additions can be made; if not then only overcrowding and lack of privacy

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1. There are no national statistics on house-seekers, but the evidence provided by our surveys and the lists of applicants for government new projects support this statement. For example, more than three quarters of the movers to government housing projects in the early 60's were found to be households headed by men in the age group (25-35) years. As this is roughly the age group which corresponds with the family growing phase, it concluded that this phase of family development is the most critical in considering housing needs.
2. In the projects visited it was found that roughly 80% of heads of households were immigrants to towns; compared with 20% born in the towns.

can result. That is because adult children seldom leave home before marriage. They do so only when job mobility demands a long journey to work.

The demand, however, is not only for more rooms but also for better facilities. The tenant's income is higher than it ever was and probably than it ever will be (because of retirement); one or two of his adult children are employed and contributing to the household expenditure; and repayments of mortgages and other debits have probably come to an end. There is therefore more money to spend on a higher standard of living and housing. Verandahs are added to the house, floors are covered with tiles or cement, external walls are rendered and painted and a better type of furniture is brought for the living room to express the new social and economic status of the family.[1] Meanwhile, relations had been established with other families in the community and these relations (together with the security and stability achieved by owning a house) make it undesirable to move to a new house. It will therefore be expected that very few families at this stage of development will be seeking to find new homes.

A few families however, might not have been able to find a house before; either because of their low incomes or because of lack of credits or, more often, both. For some of these families (particularly those with large

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1. These are some of the reasons which explain why native areas in towns of central Sudan have higher rates of reconstruction and improvement.

families) a form of credit or subsidy in cash or kind may need to be given if house ownership is to be encouraged.

(iv) THE HOUSEHOLD PHASE

When adult children get married, the family does not shrink — as it is the case with the average European family — neither does it expand indefinitely. Its size remains fairly stable by fluctuations in its population which tend to cancel one another. For example, lack of space or job mobility may compel some of its married children to leave home, but whenever there is space, some may bring in their partners and stay in the parents home temporarily or permanently; in the latter case, gradually taking over as parents decline into old age. Lodgers and other related family branches are sometimes taken in, and this helps to keep the balance between the size of the house and the size of the household.

The most important requirements at this stage, are those concerning the design of the house in relation to privacy between different family units and different age and sex groups. These have been discussed in some detail earlier in this study.[1]

7.4 TOWARDS OPTIMUM STANDARDS

This analysis has so far considered separately the effects of three different factors on family housing and space requirements; namely, family size, economic class and

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1. See Section 6.4, Part (v) above "THE PRIVATE OPEN SPACE INSIDE THE PLOT."

stage in life-cycle. To study the combined effects of these three factors, it can be possible to form a matrix for families at each stage in life cycle, representing along one axis the economic class of the family and along the other axis the size of the family, figure 37.[1] The requirements and preferences of each subgroup can be studied in further details. For example, it can be possible through further investigation to identify a number of value groups who demand different kinds of housing standards and housing solutions. This kind of analysis requires a systematic study over a number of years. In the time available for the present study it was possible to identify different economic and social groups and to point to basic differences between their requirements, but these lines of thought are needing to be taken for further investigation.

7.5 SUMMARY

Before the standards recommended in the previous section can be put into effect, it is essential to distinguish between the type of problems posed by different family economic and social groups. There are those types of families who can afford to pay for the recommended minimum standards without the need for government subsidies or credits; there are those who can afford the cost but who need a form of credit; and there are those who cannot afford

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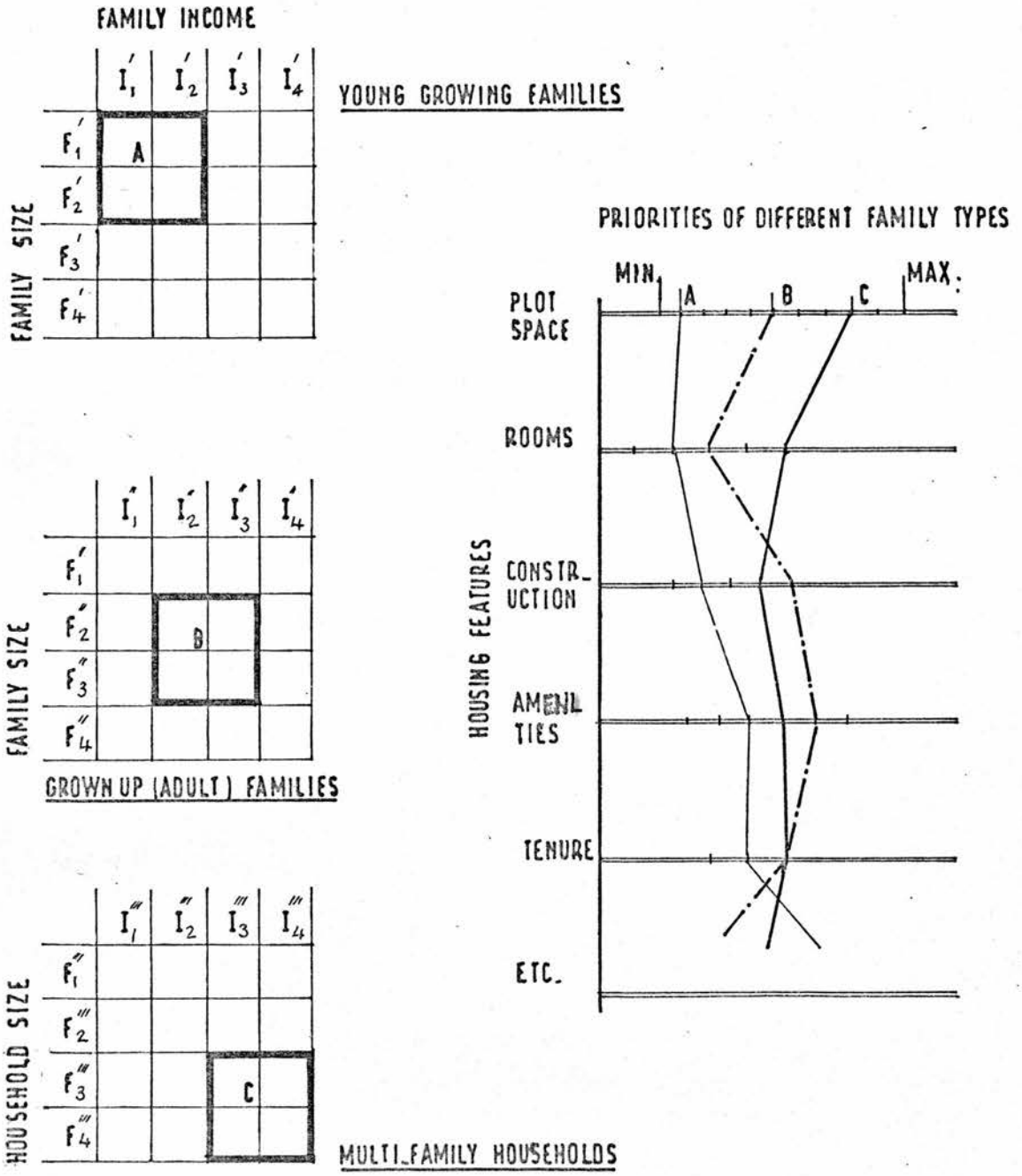
1. The figure shows 48 possible permutations of the three variables, but of course the number of permutations can be increased or decreased according to the classifications used for each variable.

figure 37:

BREAKDOWN OF HOUSEHOLDS ACCORDING TO STAGE IN LIFE-CYCLE, SIZE AND ECONOMIC CLASS



NOTE: The figure shows 48 possible permutations but these can be increased or decreased according to the scales used

to pay for the minimum standards. Superimposed within these broad patterns are other patterns representing different stages of family growth and development. The young growing family, the grown-up family and the multi-family household each presents different kinds of problems and calls for different kinds of solutions. The implementation of the recommended standards therefore demands that a number of policies and programmes should be formulated relative to the type of problems posed by each of these groups and also to the amount and type of resources available at government disposal.

As a first step towards the formulation of these policies and programmes, the above analysis suggests that:-

1. The emergence of a new family does not always mean a new house; part of the housing needs of newly formed families can be catered for by adding to existing dwellings.
2. For some newly emerging families and for young families arriving to towns, this is both socially and economically acceptable as a temporary measure.
3. Part of future housing should therefore be planned with this consideration in mind; it should be possible for the young emerging family to share house with parents or other acquaintances for some time without causing too much overcrowding or lack of privacy.
4. The greatest part of the housing need in urban areas of central Sudan appears to be formed by young growing families with few children. The present policy of

directing government schemes to serve families of five persons or more appears to be sound as it is among these type of families that the need is usually felt.

.5. Government hire-purchase schemes can serve only a few of these families (those with relatively higher incomes, who can afford the initial down payments and the subsequent monthly instalments). The great majority can best be served by providing free serviced plots (with probably a standardized service unit) and by encouraging progressive development as needs and resources change.

.6. The most important requirements of growing families with children are therefore ownership of land (as this allows a free hand to add and alter) and sufficient plot space sized and shaped in anticipation of future growth.

.7. It is usually when families approach their adulthood that the demand for more rooms, more privacy, better facilities and better materials assumes greater importance.

CHAPTER 8: FINAL CONSIDERATIONS AND CONCLUSIONS

8.1 GENERAL

In the light of the theoretical and methodological background outlined in Volume I, this study aimed to arrive at some recommendations on space standards for low-cost housing of central Sudan. The study started by examining aspects of user requirements which affect the provision and use of space in the home. These aspects were then examined in conjunction with other design, planning and policy criteria and some suggestions on space standards have been made.

The study of user requirements was based on the analysis of the results of field investigations and interviews undertaken in a number of housing projects in urban areas of central Sudan. One of these projects (Khartoum North) was taken for case study and was critically appraised in relation to user requirements.

This section gives a brief summary of the salient points which have emerged from the case study and describes the philosophy adopted in the formulation of space standards. Finally some recommendations are made and some lines for further investigation are pointed at.

8.2 REVIEW OF THE EVIDENCE OF THE CASE STUDY

In common with most projects visited, Khartoum North project was predominantly occupied by young families who had emigrated from rural areas in search for employment in the town. The evidence suggested that a number of changes has taken place in family size, social organization and

pattern of living which have wide implications on the spatial organization of the house.

(i) CHANGES IN FAMILY REQUIREMENTS

As most families were young, more children had been born after rehousing. In addition, and for various economic and social reasons, half the families had taken in lodgers and branch family units. As a result, the size of the family had grown larger and its structure more complex. This has brought about the need for more privacy and more space in the home.

Parallel with changes in the size and composition of the family there appeared to have been some changes in its social outlook and patterns of living. Compared to the traditional Sudanese household, the average family had gained more self independence and had become more conscious of its identity as a social unit. Inside the house, there had been several occasions where family members had informal meetings and gatherings and these demanded larger rooms and courtyards as well as privacy from outside intrusion. Outside the house, new friendships and new social institutions had been formed and these needed careful allocations of semi-private and public open spaces.

The economic circumstances of most families had improved significantly after rehousing. In fact judged by the standards of income or the standards of living and types of possessions, not less than half the families in Khartoum North appeared to have passed the stage of being 'low income groups.'

(ii) SATISFACTION WITH THE HOME

Changes in family structure, social outlook, patterns of living and economic ability appeared to have contributed to a general level of discontent amongst the tenants with their houses. A number of criticisms and suggestions has been made by the tenants concerning the size of the house, the number of rooms in the house, the standards of construction, facilities and services, etc. Over half the tenants found the size of the plot and the number of rooms insufficient and about one third thought the layout of the house did not allow sufficient privacy. The majority of tenants gave family size as the main reason for dissatisfaction with the size of the plot and number of rooms.

Observations on the pattern of living and pattern of use of space in the home pointed to a number of other factors which must have contributed to the tenants' demand for more space.

(iii) PATTERN OF USE OF THE SPACE IN THE HOME

After moving into the project, a number of additions and alterations had been made by the tenants to their houses. These had been made without consulting the authority or asking the help of an expert. The result in most cases had been wastage of housing space through lack of organization. This was particularly noticeable in the 'family living part of the house' where space was badly needed.

Various climatic, social and psychological factors have also operated to condition the pattern of family living

in such a way that only a small portion of the housing space was used for family living at a certain time of the day. Because of climatic reasons, family activities in the early mornings and evenings were centred in the open spaces; during mid-day family activities were centred in rooms or verandahs where the latter had been added. The requirements of prestige and social status also demanded that some of the rooms, verandahs and courtyards had to be spared for guests and unexpected callers, thereby reducing further the amount of space that could be used for family living. The demand for privacy for women folk and for separation of sexes also led to the subdivision of the housing space into separate rooms and small courtyards and this seemed to have added to the feeling of overcrowding and lack of space.

The tenants demand for extra space was in fact not without reasons; but these reasons appeared to have originated more from lack of economy in the use of the space provided than from an absolute shortage of space.

(iv) FAMILY SPACE REQUIREMENTS

It should not be concluded from the above that the family pattern of living is to be held responsible for the lack of economy in the use of space. This pattern of living is obviously the outcome of deeply rooted traditions and social customs which must be respected. The greater part of the responsibility, or rather the challenge, is in how to design for this pattern of living in an efficient and an economic way; e.g. by designing types of rooms which are liveable over longer periods of the day and suitable for multi-use and providing types of houses which are adaptable to changing family requirements. These are questions our

domestic architecture has yet to find answers for. In this respect the evidence from this study points to the following design and planning considerations:

a) There is need for more variety in the sizes and types of houses produced so as to meet the requirements of different types and sizes of families.

b) The design of the house should leave more room for future expansion and the tenants should be guided to make the best use of the space available; possibly by constructing model houses or issuing model plans showing future possibilities.[1]

c) There is need to review the type of 'rooms' provided by the conventional house plan in the light of changed circumstances. The trend is for larger and more open types of rooms. The present 'room-verandah' complex does not seem to provide the best answer. Besides being too demanding in space (and money) the room is too closed to be used for daily living and the verandah too open. Something approaching the traditional sala, but with more space and better control against the elements, can perhaps provide a better answer.

d) More attention is needing to be given to the layout of open spaces both inside and outside the house. With regard to the open space inside the house, the

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1. It must be acknowledged that this has been done in some projects with varying degrees of success. This is certainly good practice and must be encouraged even further.

evidence suggests that at least equal space should be provided in the inner (or family) courtyard as in the outer (or guests) courtyard. The layout should also make it possible to achieve sufficient privacy between sexes without the need to add screens or dividing walls.

The semi private open space outside the house must be viewed as an extension to the dwelling accommodation and must be planned to allow easy access, a certain degree of privacy for its users as well as safety from motor traffic. The pressure for more space in the home can certainly be relieved by improving the livability of the private and semi private open spaces, e.g. by gardening, simple landscaping and simple, but efficient means for sanitation and refuse disposal.

8.3 THE PHILOSOPHY IN THE FORMULATION OF SPACE STANDARDS

The above are some of the major considerations which have led to our recommended standards. There were however some other considerations most of which have been dealt with in Volume I of this study. However in working out my recommended standards I was keeping in mind that the present and expected future problems of urbanization in central Sudan call for types of solutions which can be repeated on a more substantial scale. The national economy cannot be expected to finance complete housing units at such a scale and to

the desirable standards. The tenants (most of whom are very likely to be poorer than those in Khartoum North) cannot be expected to pay the cost of the desirable standards without jeopardizing other basic necessities of life. The standards have therefore got to be flexible enough to facilitate different types of policies and programmes and to satisfy different types of family requirements and resources. Equally important, they have to allow for a continually rising standard of living and family expectations.

8.4 SUMMARY OF MAIN RECOMMENDATIONS

In the light of all the evidence received, some recommendations on space standards have been made.[1] The way these standards can be applied for families of different economic groups and stages in life-cycle has also been considered.[2] There are, however, a few more suggestions to be made concerning the implementation of the standards:-

a) It would appear that the minimum standards can best be brought within the means of the majority of the urban low income families by encouraging a greater degree of tenants' participation. This can mean direct tenant physical participation or it can mean tenant supervision and organization of the building process. The programme can be directed in such a way as to combine the economy of large scale production

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1. See; Table 10, page 112.
2. See Chapter 7.

together with the informality of the traditional private house building process.[1]

b) There will be many families who cannot afford to complete their houses to the minimum standards. These will need to be directed to achieve the standards gradually over a number of years as their economic resources improve. This suggests no rigid insistence on the roofed space standards (at least at the beginning), but the plot should be sized in anticipation of future growth.

c) For some low-income families a form of credit may need to be given and for others (those with very low and uncertain incomes) a form of subsidy in cash or kind may be necessary. Where credits are involved, the evidence suggests that the repayments should be arranged, as far as possible, to ensure a reasonable balance between family income and allocations for housing. This may require concentration of repayments at later stages when the family income is relatively high.

d) House sharing, is for some families a social and economic necessity and there are good reasons to

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1. The experience of other countries in this field is vast, varied and illuminating. The following remarks by Frieden are of some interest:-
"The appraisal of Mexico City's experience – which may be relevant for many other cities in developing countries – suggests that government programmes can help larger number of people if they are linked more closely to the informal processes of homebuilding that now account for most new housing production."
FRIEDEN, B.J. "The Search for Housing Policy in Mexico City." Town Planning Review, No. 36. July, 1965, pp. 75 - 94.

believe that it should be allowed. However, where it is allowed, at least some of the houses should be designed to allow sufficient privacy for each of the sharing families. In particular, the location of shared facilities becomes very important.

8.5 DIRECTIONS FOR FURTHER RESEARCH

It will be recalled from the opening chapter of Volume I that the minimum average space standard in recent housing projects in the Sudan has been fixed at 400 sq. m. per family (for the low income groups).[1] As this standard does not distinguish between the requirements of families of different sizes, it is difficult to find some common bases for comparing it with our recommended space standards. Nevertheless it does appear that the 400 sq. m. per family standard (which is presently in application) overestimates the social and functional requirements of families (see Table 10, page 112).

Doxiadis, viewing the problem mainly from the point of view of raising urban densities, recommended the minimum average space standard as 120 sq. m. per family for the lowest income groups.[2] Whilst admitting that the present densities of most housing areas are low and are perhaps needing to be raised, Doxiadis standards appear to have far underestimated the social and functional requirements of

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1. See Volume I, Chapter 1, Section 1.7.
2. DOXIADIS ASSOCIATES "The Future of the Capital: a Long-Term Programme and a Master Plan for the Development of the Capital." Preliminary document prepared for the Government of the Republic of the Sudan, Athens, May 1959, pp. 192, 236 and 280.

families. The study of urban densities involves a number of other factors some of which fall beyond the scope of the present study, but it is put forward as a point for further research to view the question of space standards from the point of view of economic densities and urban land requirements. It should be possible to establish maximum plot sizes beyond which it will be uneconomical to build, (from the point of view of density) and these can be viewed against our recommended minimums so as to establish 'optimum standards'.

Related to the question of densities is the question of open spaces around buildings. The low densities of the housing areas are not only arising from the large sizes of the plots but also from the large areas occupied by roads and neglected open spaces. The present study has stressed the importance of the open space around the house as an integral part of the family living space. Few remarks have been made in this study concerning the sizes and the layouts of open spaces, but on the whole there seems to be a great need for more research and experimentation in these fields to find the types of layouts which can improve the livability and healthfulness of these areas. In these respects, the New Delms Project was found to have certain features which are needing to be further examined and improved upon.

A third point for further investigation concerns the values that families of different background characteristics place on different housing features. Although a lot of material has been collected in this respect, the need for

further research in these lines was apparent. How, for example, will families of different backgrounds of education, age, income, previous housing experience etc. establish their priorities as between say more space and better facilities and services? This study was mainly concerned with the relationship between from one side the size and composition of the family and from the other, the response to the size and layout of the house. It will however be of some use for future programmes if similar studies are undertaken to cover a wider range of family characteristics and over a number of projects with different features.

8.6 FINAL REMARKS

In principle, the final test of space standards (or housing standards generally) is in the degree of satisfaction and livability that can be afforded by the house and its environment for the individual and the family. Granted the truth of this assertion, I consider the centre of the contribution of the present study to be, not so much in the quantitative figures that have become apparent, but rather in the theoretical and qualitative considerations which have led to these figures. However carefully worked out the figures may be, they cannot by themselves be sufficient to ensure satisfactory or livable homes; they must be viewed in relation to their qualitative bases and they must be reviewed and updated in the light of changing circumstances in the future.

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During all stages, my supervisors, Professor Matthew, Mr. C. Robertson and Mr. P.F. Crofts gave their advice and encouragement, and to them I would like to record my thanks.

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APPENDICES

APPENDIX 1

QUALIFYING CRITERIA FOR A LOW COST HOUSE IN KHARTOUM NORTH PROJECT (1)

1. To be of Sudanese Nationality supporting a family of not less than five members residing with him permanently.

2. His place of work and for residence should be in Khartoum North.

3. Should be an employee of Government, industrial firm, bank or commercial company receiving a monthly salary provided that remaining years of his service do not fall short of ten years at the time of application.

4. In receipt of a salary plus cost of living allowance not less than L.S. 12 or more than L.S. 25 per month.

5. To be prepared to pay 10% of the cost of the house in advance and to repay the balance plus interest at 3% in monthly instalments not exceeding $\frac{1}{4}$ of his income at the time of application.

6. Should not be owner of a house, or part of a house or a plot of building land, whether free - hold or leashold, in the Three Towns.

7. To be prepared to pay any rates, taxes or charges made from time to time by the Local Authorities.

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(1) Source: A paper prepared for the U.N. Centre for Housing, Building and Planning, by Abdullahi Hamid - Director of National Housing Authority - June 1967.

APPENDIX 2

MALE HOUSE-HOLDER INTERVIEWING FORM

Code No. | Q. 1. |

Name of informant _____

Town _____ House No. _____ Block _____

House type _____ (1, 2)

INTERVIEW SHOULD BE CARRIED OUT WITH HOUSEHOLDER
(i.e. member of household responsible for paying rent)

INTRODUCE STUDY TO INFORMANT, THEN ASK FOR:-

1. Household Composition

a. GIVE DETAILS OF EVERYONE LIVING IN THE HOUSE INCLUDING CHILDREN & LODGERS

Code No.	Relationship to informant	Age	Sex	Marital Status	Occupation	Education
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

b. No. of families living in the house _____

2. a. Are any members of your family who are financially dependent on you, living elsewhere? YES NO

If 'YES'

b. What is their relation to you _____

c. State why they don't live in this house (RECORD ALL COMMENTS) _____

3. Place of Birth

a. Were you originally born in _____ (MENTION TOWN) YES NO

If 'NO'

b. Where did you come from _____

c. When did you come _____

d. Why? (Give reasons) _____

4. Previous House

a. When did you move to this house _____

b. Where did you live before _____

c. What was the monthly rent _____

5. Tenure

a. Do you own this house
rent this house
partially rent this house
(THE OWNER OF THE HOUSE IS THE PERSON UNDER WHOSE NAME IT IS REGISTERED)

b. Is part of this house used for commercial purposes? YES NO

If 'YES'

c. Which part _____ (GIVE ROOM NUMBER)

5. Animals Kept

a. Do you keep any of the following animals in this house?

GO THROUGH LIST

Animals kept	Yes	No	Numbers	Place where they are kept (GIVE ROOM NUMBERS)
Goats				
Cows				
Sheep				
Hens				
Pigeons				
Donkeys				
Others (STATE WHAT)				

b. How many of each type are kept?

c. Where are they kept?

b. & c. GIVE DETAILS ABOVE IN APPROPRIATE COLUMNS

6. Other Possessions

a. Do you have any of the following articles?

GO THROUGH LIST

Article	Yes	No	Places where they are kept (GIVE ROOM NUMBERS)
Car			
Bicycle			
Scooter			
Radio			
Sewing machine			
Boutagas			
Washing machine			
Refrigerator			
T. V.			
Telephone			

b. Where about are they kept?
NOTE ABOVE

7. Children Play Spaces

a. Could you give me details on where children usually play?

GO THROUGH LIST

Inside rooms
In verandahs (IF ANY)
In the plot
In the street
In the nearby open space (IF ANY)
Others (STATE WHAT)

(NOTE MORE THAN ONE PLACE MAY BE GIVEN)

b. Indicate by * the most usual place

8. Sleeping Arrangement

a. Where do the following groups usually sleep or have rest

GO THROUGH LIST & GIVE ROOM NUMBERS. MORE THAN ONE PLACE MAY BE MENTIONED FOR EACH GROUP; IF SO GIVE FULL DETAILS

Group	Morning	Day	Night
Parents			
Males over 14 years			
Females over 14 years			
Children under 14 years			
Guests (IF ANY)			
Others (lodgers, servants, etc.) (IF ANY)			

9. Guests

a. How often do you have guests to stay overnight?

At least once a week
At least once a month
At least once every 6 months
At least once every 12 months
Hardly ever
Not at all

IF THEY RECEIVE GUESTS, ASK:-

b. Who are they? (e.g. relatives, friends, both)

c. In what part of the house do you entertain guests arriving at the following times

GO THROUGH LIST

Time of Day	Guests	Places where they are entertained (GIVE ROOM NUMBERS)
Morning	Males	
	Females	
Mid-Day	Males	
	Females	
Afternoon	Males	
	Females	

10. Social Functions

a. Where do you normally perform functions such as weddings, funerals, etc. ?

GO THROUGH LIST

In the plot
In the street
In the adjacent open space (IF ANY)
In the far open space
Other (STATE WHAT)

(INDICATE BY * THE MOST USUAL PLACE)

11. a. Do any member of your familly participate in any of the following social activities?

GO THROUGH LIST

Social Activity	Yes	No	Member	Outside the Scheme	Inside the Scheme
Welfare society					
Cooperative group					
Social club					
Athletic club					
Tribal group					
Others (WHAT)					

b. Who are these members?

c. Are these activities inside or outside the Shabia scheme?

b. & c. GIVE DETAILS ABOVE IN THE APPROPRIATE COLUMNS

12. Attitudes and Opinions about the House

a. What do you think about the size of the plot?

Big
Satisfactory
Small
Very small

INDICATE BY * WHERE APPROPRIATE

b. If 'SMALL' or 'VERY SMALL', ask (Why?)

_____

_____

RECORD ALL COMMENTS

13. a. What do you think about the number of bedrooms?

Big
Satisfactory
Small
Very small

INDICATE BY * WHERE APPROPRIATE

b. If 'SMALL' or 'VERY SMALL', ask (Why?)

_____

_____

RECORD ALL COMMENTS

14. Do you think the layout of rooms gives sufficient privacy with regard to

a.	Sleeping arrangement for men and women?	YES NO
b.	When there are guests?	YES NO
c.	From neighbourers and passers-by?	YES NO

NOTE ANY COMMENTS MADE TO EITHER a, b or c

15. a. What do you think about the sizes of the following rooms:-

GO THROUGH LIST & INDICATE 'BIG, SATISFACTORY, SMALL OR VERY SMALL'

Room No.	Opinion	Reasons (RECORD ALL COMMENTS)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

b. If 'SMALL' or 'VERY SMALL', ask (why?) & RECORD COMMENTS

16. a. Do you find any of the following constructions necessary?

GO THROUGH LIST

Additional room
Store
Place for animals
Verandah (STATE WHERE)
Zeer-house
Dividing wall
Others (STATE WHAT)

b. Which of these would you place 1st, 2nd & 3rd.

INDICATE BY 1, 2 & 3 WHERE APPROPRIATE

17. a. If you had the choice between this house and a piece of land, which would you prefer?

The house
The piece of land

INDICATE BY * AGAINST CHOICE & ASK,

b. Why?_____

_____

RECORD ALL COMMENTS

18. a. Do you think the house needs to be improved or altered in any way YES
NO

If 'YES'
b. What changes need to be made?

_____

_____

RECORD ALL COMMENTS

19. Economic Conditions

a. Can you tell me what your monthly income is?
_____ /month

b. Have you any other source of income? YES
NO

If 'YES'
c. How much do you earn on the average from this source of income _____ /month

20. a. Do any members of your household contribute to the household expenses? YES
NO

If 'YES'
b. Who contributes?

c. What is the average monthly contribution (as a whole)
_____ /month

21. Household Expenditure

What is your average monthly expenditure on the following items

Rents _____
Taxes _____
Electricity _____
Water supply _____
Maintenance of the house _____

22. Places of Work and Means of Transport

a. Where do you work?

Khartoum
Khartoum North
Omdurman
The Shabia Area
Other (WHERE)

INDICATE BY * WHERE APPROPRIATE

b. How do you arrive there?

Private transport
Public transport

c. What is the average monthly expenditure on transport?

_____ /month

23. Additions to the Original Plan of House

a. Have you made any of the following additions to the house?

Additions	When (year)	Approximate Cost in £S
Verandah 7		
Verandah 8		
Additional room		
Zeer-house		
Animal shed		
Dividing wall		
Other (WHAT)		

b. When?

c. What (approximately) is the cost?

b. & c. GIVE DETAILS ABOVE IN APPROPRIATE COLUMNS

Interviewers _____ Date of interview _____

Length of interview _____

APPENDIX 3

HOUSEWIVES INTERVIEWING SCHEDULE

Code No. | Q. 2. |

Name of informant _____

Town _____ House No. _____ Block _____

House type _____ (1, 2)

1. INTRODUCE STUDY TO INFORMANT THEN ASK

Use of Kitchen

a. Do you use the kitchen for any of the following purposes?

GO THROUGH LIST

Purpose	Yes	No.	Reasons why & alternative rooms
Baking kista			
Cooking & frying			
Making morning tea			
" afternoon "			
Washing dishes			
Storage of fuel (what)			
Storage of food before cooking			
Storage of food after cooking			
Storage of kitchen equipment (e.g. pans kettles, etc.)			
Storage of household utensils			

b. IF 'NO' ASK FOR REASONS AND ALTERNATIVES & NOTE IN APPROPRIATE COLUMN

2. a. Do you sometimes receive guests while in the kitchen?

YES
NO

IF 'YES'

b. Do you work while entertaining them?

YES
NO
OTHER
(e.g. depends on guest)

3. Use of Other Rooms:

a. Do you find it difficult to use the following rooms if there are male guests in the house?

Room	Yes	No	Reasons why
Kitchen			
Latrine			
Bathroom			
Verandah (IF ANY)			

b. ASK FOR REASONS AND INDICATE IN APPROPRIATE COLUMN

4. Is it difficult to go in and out of the main gate if there are male guests in the house?

YES
NO

5. a. Is your kitchen convenient to work in?

YES
NO

b. IF'NO' ASK WHY AND RECORD ALL COMMENTS

_____

_____

_____

_____

6. Attitudes and Opinions:

What do you think about the size of the kitchen?

Big
Satisfactory
Small

INDICATE BY * WHERE APPROPRIATE

7. What do you think about the size of the plot

Big
Satisfactory
Small

8. a. What do you think about the number of bedrooms?

Big
Satisfactory
Small

b. IF 'SMALL' OR 'VERY SMALL' ASK (WHY) AND RECORD ALL COMMENTS

_____

_____

_____

9. a. Are there some rooms in the house which you think are too small?

YES
NO

IF 'YES' ASK,

b. Which are these? (GIVE ROOM NUMBERS)

_____

10. a. Do you like the present kitchen?

YES
NO

IF'NO' ASK

b. In what ways do you think it could be improved?

Increase in area
Sink
Bigger windows
Shelves
Others (WHAT)

INDICATE BY * WHERE APPROPRIATE

11. a. Which of the following additional constructions do you think is necessary.

Additional room
Store
Place for animals
Verandah (WHERE)
Zeer-house
Dividing wall
Other (STATE WHAT)

Interviewers _____

Date of interview _____ Length of interview _____

APPENDIX 4

OBSERVATIONS SCHEDULE

Code No. | Q. 1. |

Town _____ House No. _____ Block _____

House Type _____ (1, 2)

OBSERVE & RECORD IN APPROPRIATE PLACES

Structural Alterations

1. a. Is there any structural alteration(s) of the original plan

YES
NO

IF 'YES'

b. State what _____

_____

_____

c. Show all alterations in the accompanying plan.

Structural Additions

2. a. Has any of the following structures been added tot he original plan of the house?

GO THROUGH LIST

Verandah (7)
Verandah (8)
Proposed room
Pigeon's shed
Animal's shed
Zeer house
Store
Kitchen verandah
Dividing wall

b. Where appropriate show in the accompanying plan where these additions were made.

3. a. Are there any other additions?

YES
NO

IF 'YES'

b. State what _____

_____

_____

c. Show their position in the accompanying plan.

Finishes

4. a. Are the external boundary walls,

rough casted
blinded
cement rendered
painted

b. Are the internal faces of room walls

oil painted
lime painted
not painted

c. State what is the floor finish of main rooms

sand
tiles
brick
cement
other (what)

d. State if the plot has

shading trees
flowers
lawns

Distribution of Furniture & Equipment

5. In the accompanying plan sketch (to scale) the distribution and layout of main furniture and equipment items (e. g. beds, armchairs, easy chairs, wardrobes, cupboards, shelves, sinks, etc.)

Study of Selected Activities

6. The following selected activities are to be observed and recorded in the attached forms (where appropriate)

Note

Observation of different activities may be done in more than one visit. For this reason permission of the family has to be asked in advance.

1. Baking Kisra (bread)
2. Cooking and frying
3. Eating
4. Entertainment of guests
5. Washing dishes
6. Washing clothes

Observers _____

_____

Date of observation_____length_____(Mins)

APPENDIX 5

STATISTICAL SUMMARY

LIST OF TABLES

7. USE OF COMMUNITY FACILITIES

   a. Places of Work

   b. Children schooling

   c. Shopping

      1. Day to day items

      2. Less frequent items

8. COMMUNITY PARTICIPATION

   a. Membership in societies

   b. Guests staying overnight

   c. Relation

9. TYPES OF HOUSEHOLDS

10. RATES OF OCCUPANCY

   a. Families per house

   b. Persons per house

11. ANIMALS AND OTHER POSSESSIONS

   a. Animals

   b. Other articles

12. USE OF SOME ROOMS IN THE HOUSE

   a. The kitchen

   b. Places where children mostly play

   c. Places where family big occasions are performed

13. ADDITIONS AND ALTERATIONS MADE TO ORIGINAL PLAN

   a. Alterations

   b. Additions

   c. Finishes

      1. External walls

      2. Room walls

      3. Floors

   d. Gardening

14. ATTITUDES AND OPINIONS ABOUT SIZE OF THE HOUSE

a. Size of the plot

1. Opinions

2. Reasons given by male heads of house-holds for thinking that plot size is small or very small.

b. Number of rooms

1. Opinions

2. Reasons given by male heads of house-holds for thinking that number of rooms is small or very small.

c. Sizes of individual rooms

1. House type (1)

2. House type (2)

d. Opinions expressed by housewives about size of kitchen

15. OPINIONS ABOUT LAYOUT OF ROOMS IN THE HOUSE

a. Visual privacy

b. Difficulties experienced by women folk in use of some rooms when there are male visitors

16. SUGGESTED ADDITIONAL CONSTRUCTIONS ACCORDING TO IMPORTANCE

a. Views of male heads of households

b. Views of housewives.

17. SUGGESTIONS FOR GENERAL IMPROVEMENT OF HOUSE

18. SUGGESTIONS MADE BY HOUSEWIVES FOR IMPROVEMENT OF KITCHEN

SAMPLE

House Type (1)	204	Houses	1719	People
House Type (2)	241	"	1970	"
Total sample	445	"	3689	"

NOTE: Unless stated, the results are given for each house type separately.

1. TOTAL POPULATION BY AGE AND SEX (Both house types)

	% of total Population									
Age Group	Under 2	2-7	8-14	15-20	21-25	26-30	31-40	41-50	51-60	Over 60
Males	5	9	12	4	5	4	6	4	1	1
Females	5	9	12	4	3	6	5	3	1	1
Both Sexes	10%	18	24	8	8	10	11	7	2	2

2. CHARACTERISTICS OF HEADS OF HOUSEHOLDS (1)

a. Marital Status

Marital Status	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
Married	93	94	93
Single	5	5	5
Divorced	1	1	1
Widowed	1	0	1

(1) The head of household is the person responsible for paying the rent

b. Age

Age Group	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
Under 20	0	0	0
20-25	5	6	6
26-30	13	15	14
31-40	40	39	40
41-50	32	28	30
51-60	8	9	8
Over 60	2	3	2

c. Education

Education Level	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
No education	18	34	27
Nursery	1	15	8
Elementary	48	33	40
Intermediate	23	12	17
Secondary	9	5	7
Over secondary	1	1	1

d. Sex

Sex	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
Males	99	98	98
Females	1	2	2

e. Occupation

Occupation	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
Manual	75	86	81
Clerical	25	12	18
Unemployed	0	2	1
Others	0	0	0

f. Place of Birth (Both House Types)

Khartoum Province ——— 20 %
Northern " ——— 64
Blue Nile " ——— 7
Kordofan " ——— 5
Dar Fur " ——— 2
Kassala " ——— 1
Southern Provinces ——— 1

g. Date of Migration (Both House Types)

Under 5 years ——— 8 %
5 - 10 " ——— 7
11;15 " ——— 16
16-20 " ——— 20
21-25 " ——— 18
Over 25 " ——— 31

h. Reasons for Migration (Both House Types)

Work ——— 91 %
Other Reasons (1) ——— 9

(1) e.g. To join the rest of the family

3. CHARACTERISTICS OF HOUSEWIVES

a. Age

Age Group	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
Under 20	7	3	5
20-25	30	34	32
26-30	20	14	17
31-40	36	38	37
41-50	6	10	8
51-60	1	2	1
Over 60	0	0	0

b. Education

Education Level	House Type (1) %	House Type (2) %	BOTH HOUSE TYPES %
No education	56	79	69
Nursery	0	0	0
Elementary	34	16	24
Intermediate	8	3	5
Secondary	2	2	2
Over Secondary	0	0	0

c. Working or Not (Both House Types)

Housewife working _____ 3 %

" not working _____ 97

4. DISTRIBUTION OF FAMILIES BY INCOME

a. Monthly Income (of head of Household)

Range of Monthly Salary (in Snd £)	House Type (1) %	House Type (2) %
Under 10	0	1
10-15	3	23
16-20	7	40
21-25	17	15
26-30	31	10
31-35	18	3
36-40	11	3
41-50	6	3
51-60	3	1
Over 60	4	1

b. Additional Income (1)

Range of Monthly Add. Income (snd £)	House Type (1) %	House Type (2) %
Under 5	32	14
5-10	44	52
11-15	16	6
16-20	0	18
Over 20	8	9

(1) 32% of heads of households in Type (1) have Add. Income

22% of heads of households in Type (2) have Add. Income

c. Sources of Additional Income

Source	House Type (1) %	House Type (2) %
Additional Work	60	48
Working children (2)	15	28
Lodgers	0	2
Subletting	3	8
Other (3)	12	15

(2) Average working force per house = 1.6 persons

(3) e.g. other rented property

5. PREVIOUS HOUSE (Both House Types)

a. Towns

Khartoum _____ 11 %

Khartoum North _____ 79

Omdurman _____ 7

Khartoum Suburbs — 1

Others _____ 2

b. Number of Bed Rooms

1 Bed room _____ 39 %

2 Bed rooms _____ 42

3 Bed rooms _____ 13

4 Bed rooms _____ 5

More than 4 B. Rs. — 1

c. Rent

Rents vary from an average of £5 for a house with one or two bed rooms to an average of £8 for a house with more than 2 rooms. Rents of between £5 (10-15) / month are common.

6. PRESENT HOUSE

a. Tenure

Tenure	House Type (1) %	House Type (2) %	Both House Types
Owned	67	69	68
Sub-letted	23	16	20
Partly sub-letted	8	14	11
Other	2	1	1

b. Length of Residence

Length of Residence	House Type (1) %	House Type (2) %
Under 1 year	12	16
1-2½ years	27	35
2½-5 "	46	49
5-7½ "	5	0
7½ - 10 "	0	0
Over 10 "	0	0

c. Rent (1)

Rent /Month (in L.S)	House % Type (1)	House % Type (2)
Under 2½	2	4
2½-5	15	52
5-7½	40	6
7½-10	9	37
Over 10	34	1

(1) In case of Subletting ,

The average rent for House Type (1) is L.S 13/ month

The average rent for House Type (2) is L.S.7½/ month

7. USE OF COMMUNITY FACILITIES

a. Places of Work

Place of Work	House Type (1) %	House Type (2) %
Khartoum	42	40
Khartoum north	52	53
Omdurman	4	3
Shabia area	0	2
Others	2	2

50% use public transport to arrive to work.

Average expenditure on transport = L. S $1\frac{1}{2}$/month

b. Children Schooling

Place of School	House Type (1) %	House Type (2) %
Khartoum	14	10
Khartoum north	48	42
Omdurman	3	6
Shabia area	34	37
Others	1	5

c. Shopping

a. Day-to-Day Items (eg vegetables)

Place	House Type (1) %	House Type (2) %
Khartoum	11	6
Khartoum north	53	45
Omdurman	0	0
Shabia area	50	55
Others	0	0

b. Less Frequent Items (eg clothes)

Place	House Type (1) %	House Type (2) %
Khartoum	32	21
Khartoum north	77	85
Omdurman	10	4
Shabia area	13	6
Others	0	0

8. COMMUNITY PARTICIPATION

a. Membership in Societies

Society	House Type (1) %	House Type (2) %
Welfare Society	82	83
Cooperatives	18	18
Social Club	28	27
Athletic club	20	16
Tribal Group	9	11
Village Group(1)	20	25
Others	3	2

(1) A group started by people who came from the same village

b. Guests staying Overnight

Frequency of Guests	House Type (1) %	House Type (2) %
At least once a week	37	32
At least once a month	37	40
" " once every six months	11	12
At least once a year	2	3
Hardly ever	13	13

c. Relation

	House Type (1) %	House Type (2) %
Relatives	89	88
Friends	10	11
Both	1	1

9. TYPES OF HOUSEHOLDS

Type of Households	House Type (1) %	House Type (2) %	Both House Types %
Elementary Family[1]	45	56	51
Elementary Family and lodgers [2]	26	20	23
Two Elementary Families merged together [3]	17	13	15
Multi-Household Dwelling Units [4]	12	11	11

(1) Family consisting of husband, wife and their children

(2) Lodgers include all friends and relatives who stay in the house, but do not belong to the elementary family. In this analysis, father, mother, brother and sisters are considered as lodgers.

(3) Refers to families that are merged together but still function as the household, (eg married, daughter, and her husband and children)

(4) Refers to cases where more than one family share the same dwelling but run domestic and economic affairs separately.

10 RATES OF OCCUPANCY

a. Families per House

Average number of families/house Type (1) = 1.23 F./house

Type (2) = 1.28 "

Both Types = 1.26 "

b. Persons per House

Persons/House	House Type (1) %	House Type (2) %
Under 5 persons	6	7
5 persons	3	6
6 persons	11	13
7 persons	13	11
8 persons	15	20
9 persons	20	12
10 persons	11	10
11 persons	11	8
12 persons	5	7
13 persons	3	2
14 persons	2	3
Over 14 persons	1	0

Average Occupancy Rate Type (1) = 8.7 persons/house

Average Occupancy Rate Type (2) = 8.2 persons/house

Average Occupancy Rate Both Types = 8.4 persons/house

11. ANIMALS AND OTHER POSSESSIONS

a. Animals

11. ANIMALS AND OTHER POSSESSIONS

a. Animals

Type of Animal	House Type (1) %	House Type (2) %
Goats*	37	49
Cows	0	0
Sheep	1	2
Hens*	36	41
Pigeons*	36	36
Donkeys	0	1
Other	6	13

* In over 85% of the sample, goats, hens and pigeons are kept in the Yard. (9) Sometimes separate sheds are built for them.

b. Other Articles

Article	House Type (1) %	House Type (2) %
Car	10	2
Bicycle	37	43
Scooter	5	2
Radio	82	67
Sewing Machine	37	20
Boutagas	4	2
Washing Machine	1	0
Refrigerator	9	3
T.V.	7	2
Telephone	2	1

12. USE OF SOME ROOMS IN THE HOUSE

a. The Kitchen

Use of Kitchen For	House Type (1)	House Type (2)
Baking Kisra	10	2
Cooking and Frying	80	43
Prep. Morning Tea	80	46
" Afternoon "	78	46
Keeping Kitchen Utensils	75	50
Storage of Fuel	37	18
Storage of Food Before cooking	77	44
Storage of food After cooking	78	46
Receiving of Women Guests	67	44
Washing Dishes	34	18
Washing Clothes	2	5

b. Places Where Children Mostly Play

Place (1)	House Type (1) %	House Type (2) %
Inside Rooms	14	14
In Verandahs	36	19
In the Plot	69	53
In the Street	49	50
In the Nearby Open Space	11	8
Others	5	0

(1) In some cases more than one place was given

c. Places Where Family Big Occasions are Performed

Place	House Type (1) %	House Type (2) %
In the Plot	60	53
In the Street	39	42
In the Nearby Open Space	13	14
In the Far Open Space	4	1
Others (2)	9	3

(2) Mostly neighbourers house

13. ADDITIONS AND ALTERATIONS TO ORIGINAL PLAN

a. Alterations

Type of Alteration	House Type (1) %	House Type (2) %
External Door	8	2
External Wall material	3	2
Position of Doors and Windows	1	0
Others	0	0

b. Additions

Type of Structure Added	House Type (1) %	House Type (2) , %
Verandah (7)	43	46
Verandah (8)[1]		57
Proposed Room	9	7
Pigeons Shed	47	52
Animals Shed	26	39
Zeer House	35	45
Store	7	5
Kitchen Verandah	23	51
Dividing Wall	10	15
Others[2]	17	33

(1) House Type (1) has verandah (8) as part of the original plan

(2) Minor additions such as door between men's verandah and womens verandah

c. Finishes

1. External Walls

Type of Finishing	House Type (1) %	House Type (2) %
Rough Casted	2	0
Blinded	42	34
Cement Rendered	29	19
Painted	38	33

2. Room Walls , (Internally)

Wall Finishing	House Type (1) %	House Type (2) %
Oil painted	17	9
Lime painted	79	72
Not painted	4	19

3. Floors(1)

Floor Finishing	House Type (1) %	House Type (2) %
Sand	66	83
Tiles	19	7
Bricks	19	7
Cement	11	8

(1) The original floor was sand

d. Gardening

The Plot has	House Type (1) %	House Type (2) %
Shading trees	6	20
Flowers	48	48
Lawns	8	3

14. ATTITUDES AND OPINIONS ABOUT SIZE OF THE HOUSE

a. Size of the Plot[1]

1. Opinions

Opion about Plot Size[1]	House Type (1) %		House Type (2) %	
	Householder	Housewife	Householder	Housewife
Big	2	0	2	1
Satisfactory	45	90	36	82
Small	47	7	47	18
Very small	6	3	15	4

(1) Plot size of House Type (1) = 320 sq. m.

(2) Plot size of House Type (2) = 250 " "

2. Reasons Given by Male Heads of Households For Thinking that Plot Size is "Small" or "Very Small"

Reason[2] Because	House Type (1) %	House Type (2) %
Family size is big	73	72
It does not provide enough room for activities and furniture	2	1
Large portion of the plot is covered by rooms	10	7
Other reasons[3]	21	32

(2) More than one reason was sometimes given

(3) Some of these said, "there is more than one family in the house", but others just gave no reason.

b. Number of Rooms (1)

1. Opinions

Opinion about Number of Rooms	House Type (1) %		House Type (2) %	
	Householder	Housewife	Householder	Housewife
Big	1	0	0	1
Satisfactory	45	80	23	55
Small	48	10	62	37
Very Small	6	10	15	7

(1) House Type (1) has 3 rooms + verandah
House Type (2) has 2 rooms

2. Reasons Given by Male Heads of Households For Thinking that Number of Rooms is "Small" or "Very Small"

Reason Because	House Type (1) %	House Type (2) %
Family size is big	90	80
There is much furniture	1	5
There are certain activities not catered for	3	2
Other reasons	7	19

c. Sizes of Individual Rooms

1. House Type (1)

Opinion About Size of Room	Room Number (See plan of House Type (1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)*	(8)
Big	0	0	1	1	2	0	1	1
Satisfactory	45	46	54	78	87	90	87	93
Small	53	52	43	19	11	10	10	6
Very small	2	2	2	1	0	0	1	0

* Applicable only in cases where Verandah (7) was added

2. House Type (2)

Opinion About Size of Room	Room Number (See plan of House Type (2)							
	(1)	(2)	(3)*	(4)	(5)	(6)	(7)†	(8)†
Big	0	0		0	1	0	0	0
Satisfactory	44	45		69	89	87	88	86
Small	53	53		29	9	12	11	14
Very small	3	2		2	1	1	1	0

* Only two bed rooms (no Room (3))

† Applicable only in cases where Verandahs (7) and (8) were added

d. Opinion Expressed by Housewives About the Size of Kitchen

Opinion	House Type (1) %	House Type (2) %
Big	1	0
Satisfactory	84	77
Small	14	18
Very Small	1	5

15. OPINIONS ABOUT THE LAYOUT OF ROOMS IN THE HOUSE

a. Visual Privacy

The Layout of Rooms in the Plot Gives Privacy	House Type (1)		House Type (2)	
	Yes	No	Yes	No
W.r.t. sleeping arrangement for both sexes	70	30	65	35
For women folk when there are Male Guests	39	61	36	64
From Neighbourers and Passers-By	55	45	54	46

b. Difficulties Experienced by Women Folk When there are Male Visitors in the House

Is it Difficult to Use	House Type (1)		House Type (2)	
	Yes	No	Yes	No
Kitchen	1	99	6	94
W.C.	80	20	85	15
Bath room	2	98	12	88

16. SUGGESTED ADDITIONAL CONSTRUCTIONS ACCORDING TO IMPORTANCE

a. Views of Male Heads of Households

Priority	Additional Room	Extra Plot-area	Verandah	Zeer House	Dividing Wall	Animal's Shed
1st	30%	24	18	5	5	2
2nd	23	9	18	16	14	1
3rd	9	10	18	16	12	4

House Type (1)

Priority	Additional Room	Verandah	Extra Plot-area	Dividing Wall	Zeer House	Animal's Shed
1st	29%	28	24	2	1	1
2nd	30	23	8	6	9	3
3rd	10	13	14	10	15	5

House Type (2)

b. Views of Housewives

Priority	Additional Room	Zeer House	Verandah	Store	Dividing Wall	Animal's Shed
1st	32%	27	17	10	7	2
2nd	22	23	13	16	12	3
3rd	7	14	9	23	16	6

House Type (1)

Priority	Additional Room	Verandah	Zeer House	Dividing Wall	Store	Animal's Shed
1st	49%	25	12	5	4	1
2nd	19	16	29	13	12	4
3rd	11	10	17	18	12	9

House Type (2)

17. SUGGESTIONS FOR GENERAL IMPROVEMENT OF HOUSE

Suggestions	House Type (1) %	House Type (2) %
Improvement of Building Material	27	70
Maintenance	7	39
Water privy (1)	27	38
Ceiling (2)	21	38
Another Ext. door	11	19
Another bathroom	16	14
Increase of Ext. walls' height	11	9

(1) Some of the earlier built houses have pit latrines but the recent ones have water privys

(2) Rooms are roofed with corrugated asbestos sheets but have no ceiling

18. SUGGESTIONS MADE BY HOUSEWIVES FOR IMPROVEMENT OF KITCHEN[1]

Suggestion	House Type (1) %	House Type (2) %
Fix shelving	57	37
Fix sink	49	33
Increase of Area	25	33
Fix working top	20	1
Bigger Windows	20	30

(1) When asked if they like their present kitchen 59% of housewives in Type (1) and 60% of housewives in Type (2) said they do not.